

POPULAR COMMUNICATIONS

JANUARY 1983 \$1.75

**Radio Jamming:
The Electronic
Iron Curtain**

**POP'COMM Scans
The Air Force
Security Police**

**Ten Ways To Enjoy
Your Scanner More**

**Build A
Free-Power
Survival Receiver**

**The Truth About
Cordless Phone
Range**

**Field Communications Exercises
Keep Survivalists Ready
For Anything . . . page 18**



IC-R70

NEW!

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



GENERAL COVERAGE RECEPTION AT ITS BEST

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

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

DESIGN

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

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

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

HAM'ING

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

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

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

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

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

SWL'ING

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

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

ICOM SYSTEM

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

PRICE

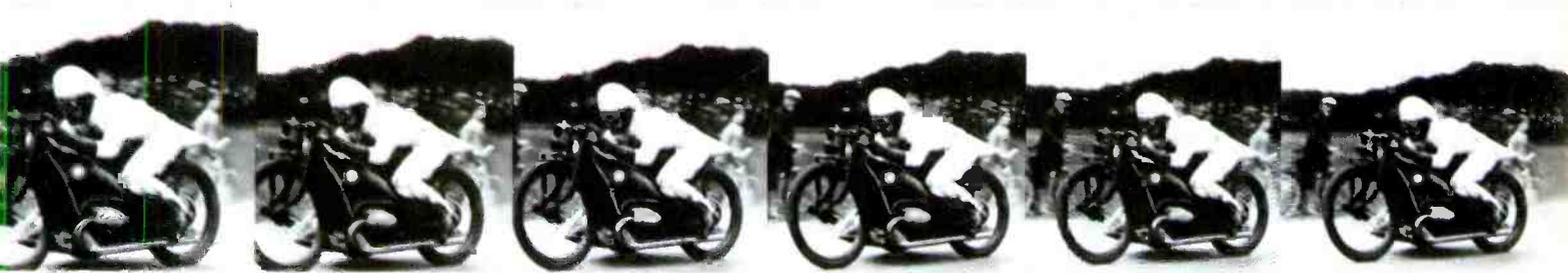
Check with your local ICOM dealer for pricing on the R70. You will be amazed.

CIRCLE 75 ON READER SERVICE CARD



The World System

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



INTRODUCING THE LATEST HEIR TO 59 YEARS OF GERMAN ENGINEERING.

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

The drafting tables of German engineers.

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

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

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

The bike's slender tail,

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

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

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

increase handling prowess but decreases unsprung weight.

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

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

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

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

THE LEGENDARY MOTORCYCLES OF GERMANY.



CIRCLE 151 ON READER SERVICE CARD



Moto-trak



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

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

- 12 automatic satellite selections at the twist of a dial
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- Constant LED Azimuth/Elevation readout
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- 12' solid aluminum dish or 16' screened dish for a perfect picture

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

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

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CIRCLE 27 ON READER SERVICE CARD

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SR-3

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- LED signal strength readout
- Positive detent channel tuning plus fine tune
- Full audio tuning/stereo version available
- Video inversion

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8" DSDD Soft Sector (128 B/S, 26 Sectors)	3115	3.34
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8" DSDD Soft Sector (512 B/S, 15 Sectors)	3114	3.34
8" DSDD Soft Sector (1024 B/S, 8 Sectors)	3104	3.34
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5 1/4" DSDD Soft Sector w/Hub Ring	3491	3.09
5 1/4" DSDD 10 Hard Sector w/Hub Ring	3493	3.09
5 1/4" DSDD 16 Hard Sector w/Hub Ring	3495	3.09
5 1/4" SSQD Soft Sector w/Hub Ring (96 TPI)	3504	2.99
5 1/4" DSQD Soft Sector w/Hub Ring (96 TPI)	3501	3.99

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

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Memorex IV 1200 feet Wrightline Seal	25FW	10.65
Memorex Quantum 2400 feet Wrightline Seal	27JW	16.20
Memorex Quantum 2400 feet Easy Load II Cart.	27JR	16.99
Memorex Quantum 1200 feet Wrightline Seal	27FW	12.50
Memorex Cubic HD 2400 feet Wrightline Seal	39JW	18.99
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Product Description	Part #	CE quant. one price per pack (\$)
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CMD-16 "Phoenix Type" CDC Cartridge	98-26600-31	160.00
NCR Cartridge	98-26600-32	160.00
Mark VIII 80 MB. Error Free	72-16600-03	330.00
Flag Free	72-26600-03	320.00
Mark XI 200 MB. Error Free	03-35041	720.00
Flag Free	03-35031-02	560.00
DEC Flag Free	03-35031-03	560.00
Mark XII 200 MB. NCR/CDC Flag Free	03-39001-01	515.00
Honeywell Flag Free	03-39000-01	515.00
Mark XIII 300 MB. Error Free	03-47021	795.00
Flag Free	03-47009	670.00
Mark XIV 80 MB. Unformatted Error Free	74-16600-03	365.00
Flag Free	74-26600-03	300.00
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Mark XV 300 MB. Error Free	03-49011	825.00
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POPULAR COMMUNICATIONS

JANUARY 1983**VOL. 1, NO. 5****8****31****38****FEATURES****Jamming: The Electronic Iron Curtain 8**The history, techniques, effectiveness, and current status of deliberate jamming of radio signals.
*by Tom Kneitel, K2AES***Ten Ways To Have More Fun With Your Scanner 14**OK, so maybe you know 2 or 3 of them—but it's those other 7 or 8 that are going to make all the difference in the world to you.
*by KCA6LX***Survival Communications: Unpowered Receivers 18**Unlike an unpowered car, this type of receiver is of real value. What's more, you can build one without expertise. Doesn't even need batteries!
*by R.L. Slattery***POP'COMM Intelligence Report: USAF Security Police 31**

Frequencies as well as many of the codes, buzz words, and ID's used by those who are part of this efficient operation.

New Consumer's Radio Service 36

General Electric came up with this concept and is seeking FCC approval for the idea.

DX'ing The Dominion 42Canada offers the serious DX'er some rather unique low power DX challenges. Here's how you can meet the challenge.
*by Gerry L. Dexter***POP'COMM Kwik Project: Line Noise Filters 45**Here are some sure-fire ways to filter out interference from the power lines before it gets into your scanner or communications receiver.
*by N.C. Oldenburg, KFL4RH***POP'COMM Scans The Burns Security Services 50**An inside look at the communications network used by a leading security company that provides a multitude of services.
*by Rick Maslau, KNY2GL***Scanning Georgia Troopers 60**Everything will be peachy if you use our handy guide to the frequencies and codes used by the Georgia State Troopers.
*by Clarence Wilson, KGA4FV***We Liked These Books! 62**

Some recently published books we think our readers will find useful.

Leaves From A DX'ers Scrapbook 70

Here's an assortment of rare old QSL cards as collected by a veteran DX'er.

*This month's cover: Survivalists Ira M. Weiner and Charles Koemm get set for a communications drill. Photographed by Larry Mulvehill with the kind cooperation of Adventure World Sport & Survival Systems, Poughkeepsie, NY.***DEPARTMENTS**

Beaming In	6	Satellite View	38
Survival	18	Scanner Scene	54
POP'COMM Products	20	Washington Pulse	56
RTTY Monitoring	23	Mailbag	64
Communications Confidential	24	Radar Reflections	67
On The Line	28	Free Radio Focus	72
Listening Post	34	Communications Shop	74

Offices: 76 North Broadway, Hicksville, NY 11801. Telephone 516 681-2922. Popular Communications (ISSN 0733-3315) is published monthly by Popular Communications, Inc. Corporate officers: Richard A. Ross, Pres.; Thomas S. Kneitel, Vice Pres.; Alan M. Dorhoff, Secretary. Application to mail at controlled circulation rates pending at Hicksville, NY and additional points. Subscription prices: Domestic—one year \$12.00, two years \$22.00, three years \$32.00. Canada/Mexico—one year \$14.00, two years \$25.00, three years \$38.00. Foreign—one year \$16.00, two years \$30.00, three years \$44.00. Foreign Air Mail—one year \$69.00, two years \$136.00, three years \$203.00. Entire contents copyright ©1983 by Popular Communications, Inc. Popular Communications assumes no responsibility for unsolicited manuscripts, photographs, or drawings. Allow six weeks for change of address or delivery of first issue. Printed in the United States of America. Postmaster: Please send change of address to Popular Communications, 76 North Broadway, Hicksville, NY 11801.

BEAMING IN

AN EDITORIAL

How's This For An Idea?

One of the greatest things about the discovery of radio has never been discussed, although it's been in evidence since the early part of the century. Maybe it's been such a natural phenomenon that nobody ever noticed it. Guessed what it is?

It's that people like to talk, yak, communicate, and otherwise propagate things that they think and feel—express opinions; and the sight of a microphone placed within range of any of us usually triggers all of this into action on a grand scale. Throughout the years, so many AM and FM broadcasting stations have piled onto the airwaves to permit people to have their say that there's hardly any space left for new stations under existing regulations. CB and Amateur Radio stations in our homes and vehicles permit us to become personally active in all of this—but within limitations. That's the rub.

Amateur Radio and CB are outlets for people to yak and express opinions, but only on a one-to-one basis. They are essentially intended to permit us to address our thoughts to one other specific station, and not to the public in general. Of course, there's no guarantee that the general public is actually interested in hearing what someone has to say. That is why the broadcast industry has *Arbitron* and *Neilson* surveys—to find out which of the things being said are generating an audience, and which aren't. There are sponsors to satisfy, and they've got to prove to those sponsors that whatever they're saying is of interest to the public.

Trying to establish a broadcast station means going through the rigors of getting a broadcast license. Aside from the shortage of available frequencies, high technical and financial standards must be met. All in all, it calls for a formidable amount of time, trouble, engineering expertise, and money to get a broadcasting station on the air. It's totally beyond the resources of the majority of citizens to ever own a broadcast station.

This isn't to say that there aren't loads of people who would very much like to have their own personal broadcasting station. For many years now there have been persons who have taken a blunt and seemingly "easy" approach to the problem. They have simply set up shop without benefit of a license on a self-assigned frequency. Sometimes this has caused interference to licensed broadcasters, or produced distorted and poor quality signals. But it has never failed to produce anguish in the halls of those governments where such stations blossom and grow. Lately, on a worldwide basis, they've grown into a very large number of stations. You might assume that there

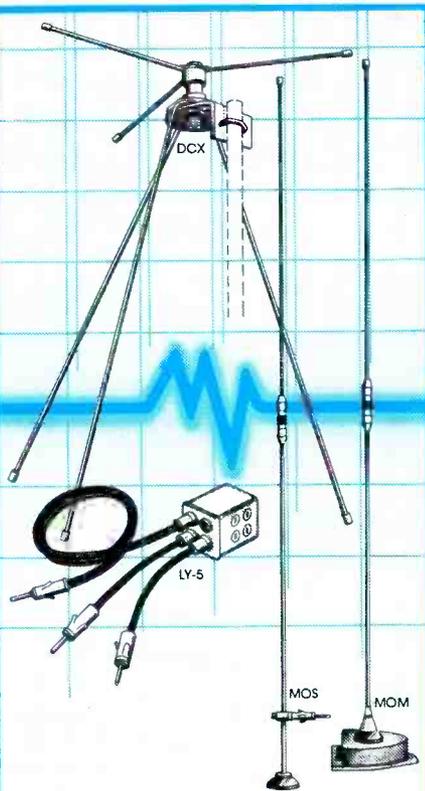
are many thousands of persons who would elect to do likewise but have not been willing to actually put a pirate broadcast station on the air. Clearly, it's a violation of federal regulations.

It would seem, however, that perhaps now is the time to stop and think about the possibilities of establishing some sort of arrangements whereby the average person could establish a personal broadcasting station within the sanctions of government. The public's desire apparently exists for such a service—if not necessarily on the part of the potential listeners, at least on the part of those who would broadcast. These people aren't seeking to solicit commercial sponsors and go into competition with their community's broadcasters. Mostly, they are seeking to provide what they feel is programming not available on commercial stations and, as such, they would be competing only for listeners. In a society based upon free speech and offering the consumer (listener) a choice of alternatives, such stations could actually garner audiences, prove to commercial broadcasters that there are areas where they are missing the boat with audiences.

I see this as a non-commercial activity (no commercials), established for low power operation, and serving a local neighborhood or community. If established on frequencies currently popular with pirate broadcasters (around 1610 or 1620 kHz), stations running 2 to 5 watts into limited size antennas would easily cover local communities and could be heard over existing AM broadcast receivers. Other frequencies could be found in the VHF or UHF bands that could also do the job—maybe just below 88 MHz near the FM broadcasting band, or somewhere else. Cordless telephone console units currently operate around 1700 kHz while the handhelds operate above 49 MHz; these are two other areas where space could be found. Reception of these frequencies could be achieved by low cost converters or receivers that could be offered to the public.

Not that I foresee clear sailing for such a new service, despite the fact that the public would absolutely love it. Broadcasters would fight it right down the line. The FCC would probably be disinterested in considering it since it is simply too unorthodox a concept. I suspect they feel that their existing Part 15 regulations would already permit a form of localized personal broadcasting. Furthermore, the FCC would also see a

(continued on page 74)



HUSTLER Monitor Antennas Bring In All Of The Action

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Jamming: The Electronic Iron Curtain

***Primarily An Anti-Propaganda Technique,
Jamming's Fascinating Story Is An Eerie Tale!***

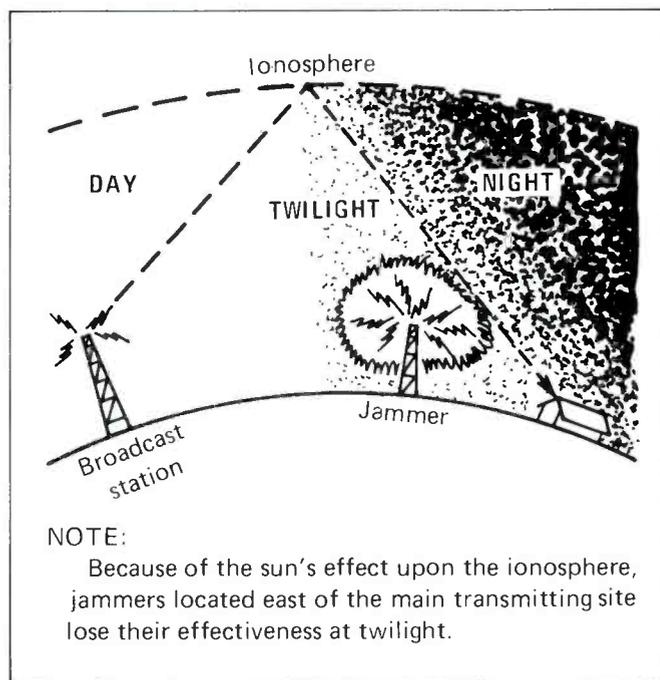
The scene is a Communist bloc nation somewhere in Eastern Europe. Several people are clustered around a small short-wave receiver. There is only silence, interrupted by a few crackles of static emerging from the set's loudspeaker. Suddenly, the static vanishes, a signal has filled the receiver. The listeners nervously look at their wrist watches. Then a voice emerges from the receiver; it's in their own language. "Aici e Radio Europa Libera—," then a few more seconds of silence as the receiver is adjusted to bring in the station a little better. It's the broadcast from Radio Liberty, bringing news and propaganda from the West to those in that nation.

In less than a minute there is no further attempt to tune in the station, for the frequency is abruptly taken over by a sound which has all of the appeal of listening to a chain saw. It isn't an unfamiliar sound, not to these listeners or most others trying to hear broadcasts from the West in that nation or its neighbors. It's the sound of jamming; deliberate noise transmission with the intent of preventing listeners from hearing whatever is being broadcast on that frequency. It's the flip side of propaganda broadcasting; it is a blunt, illegal, and usually effective anti-propaganda technique that delivers its own message. The message plainly states, "You can't hear what you want to because someone decided they don't want you to hear it."

The noise is so intense and loud that its purpose is obviously calculated to accomplish more than simply wiping out normal reception; it's so irritating that it has all of the appeal of the sound of fingernails scraping along a blackboard. The sound leaves the listener little choice. His options consist of tuning his receiver to another station with a "more acceptable" message, or else turning off the set in defeat.

Jamming consists of broadcasting a signal on the same frequency of a station whose programs have been targeted for electronic destruction. Sometimes, two stations will inadvertently end up on the same frequency and they cancel out each other's efforts. However, in most instances, when two shortwave broadcasters occupy the same frequency simultaneously, it's the result of careful planning by one of the broadcasters.

While jamming can consist of actual broadcast program material so that its rather a subtle technique (leaves the listener wondering which of the stations is trying to jam the other), noise jamming leaves little doubt as to what's going on. Noise jamming comes in many different irritating styles, known to listeners by various descriptive nicknames such as grunts, bagpipes, pulses, buzz-saws, babbles, single or multi tones, gulls, or humming sounds, to name but a few. The end result is the same—noise, grating, intolerable, and devastating to the transmission of program material.



It's Nothing New

The popular concept is that broadcast jamming came into being right after World War II when the Russians created it as an adjunct to the Iron Curtain. Not so. It goes back into the 1930s.

In 1937, a year prior to the German invasion of Austria, the Austrians tried to jam German propaganda broadcasts beamed into their nation. That same year, jamming was used against the loyalist broadcasting station in Madrid during the Spanish Civil War. RADEX, a popular DXing magazine of the era, commented (in its November, 1937, edition) on the Madrid broadcasts with the observation, "On many nights, signals from Madrid were blotted out completely by a loud buzzing interference on the same frequency. Other instances prove rather conclusively that propaganda by radio can be silenced almost at will."

Jamming on a larger scale didn't take very long to evolve. In fact, in 1938 Russia started to jam anti-Communist programs originating in Germany. The Nazis responded in kind, obliterating all of the Russian broadcasts aimed at the German people. The Italian government of Benito Mussolini also got into the act by buzzing-out all Russian broadcasts in the Italian language. However, it was not a technique which was unknown to Mussolini. Two years earlier, in 1936, the Italians invaded Ethiopia and when the Ethiopians attempted to appeal to the world for help, their broadcasting station in Addis Ababa was jammed by the Italians.

World War II saw the technique of jam-



The primary exponent of broadcast jamming in the West is Fidel Castro, whose jamming technique basically consists of establishing local broadcast transmitters on any frequencies used to beam propaganda transmissions to Cuba. United Nations photo by Y. Nagata.

ming not only stepped up but also developed into a rather sophisticated art, with jamming concepts broadened out to include military communications in addition to propaganda broadcasts. Jamming became the art and science known as "electronic countermeasures." Efforts to defeat jamming became known as "counter-countermeasures."

Of course, the inspiration for the blossoming out of jamming was only in keeping with the increased use of radio as a communication and broadcast weapon. Germany and Italy freely used broadcast jamming, and, to a somewhat lesser extent, so did Japan. These nations had established well oiled propaganda machines to feed their citizens their own versions of what was taking place

in the war and there was little tolerance for the interpretations of such events as seen by other nations. The broadcasts from the BBC, in particular, were zapped by the Nazis with vigor and dedication throughout most of the war. Most people felt that when the war ended, the use of jamming would also see its final days. No way!

After the War

By 1946, the Russians and the Spanish were tuning up their jamming equipment with the intent of purging one another's broadcasts from internal reception within their respective nations. By 1949, the BBC's broadcasts, having had only a scant 4 years of freedom from jamming, were add-

ed to Moscow's jamming itinerary. By 1950, the Russians had decided to include broadcasts from the United States within the scope of their noise broadcasts. From that time on, the Russians and their allies have been the major proponents of international broadcast jamming, although others (usually from within totalitarian nations) have also had their chance at bat.

Intelligence reports indicated that when the Russians fired up their transmitters against Spain in 1946 there were about a dozen transmitters in service. Within a few years, there had been a 10-fold increase in Russian jammers, aided effectively by jamming transmitters located throughout Eastern Europe. The result was a complex jamming network, well coordinated, and very active. And as the West stepped up broadcasting to the Soviets and their satellite countries, so did those nations increase their efforts to block the signals from entering their borders. By 1952, there were about 1,500 jamming stations operating in the Russian network, with at least 2,000 going about their business by the mid-1950s. Since that time, jamming has been an on and off affair, with increases and decreases closely following world events. These variations are also alternately directed towards specific nations that drift in and out of favor with the jammers.

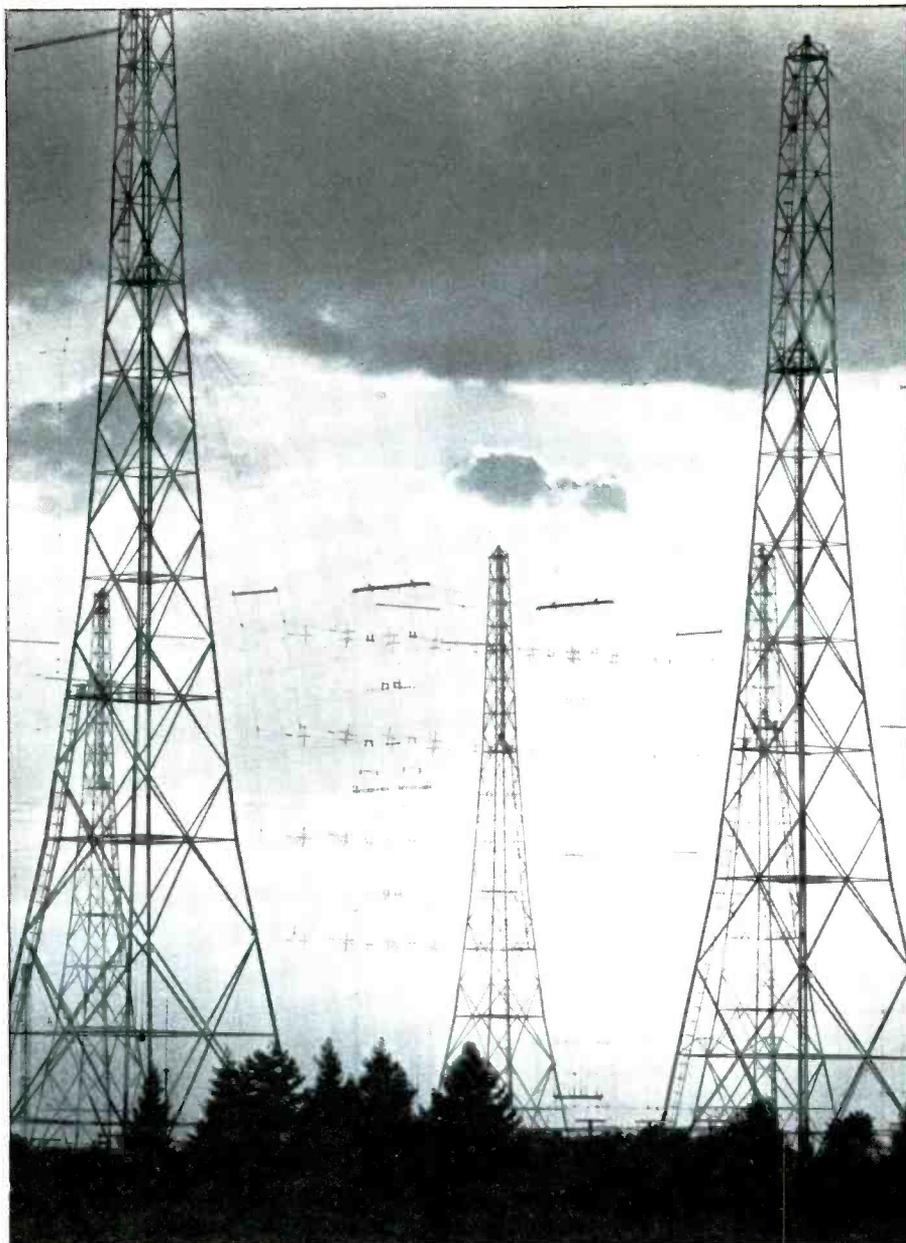
When Khrushchev and Bulganin went to Britain in the spring of 1956, the Russian jammers took a vacation from their operations on the BBC's Russian language programs, although the BBC's broadcasts to the Soviet allies in Eastern Europe kept on going without a break.

The BBC's respite was short-lived, for when the Hungarian revolt took place in October of 1956, the Russians again keyed up their transmitters on top of the BBC's broadcasts. By 1957, the mainland Chinese also decided to get into the jamming business, and that didn't sit well with the Russians.

In August of 1964, just two days after the Chinese Communists said that they wouldn't attend any international congress on the ideological rift in the Communist camp, Russia decided it was the last straw. That's when Moscow started deliberate jamming of Radio Peking's broadcasts in Russian. For the first time in almost 30 years of jamming, the Russians has used jamming against another Communist nation. To mark this momentous occasion, Moscow did not use the tired old noise jammers against Peking. Instead, they sent out actual broadcasts on Radio Peking's frequencies. The Chinese failed to recognize this unique honor in the spirit of good sportsmanship.

They reacted by shifting around their frequencies in order to escape the harassment, sliding from 3 to as many as 40 kHz up and down the band at regular intervals. The Russians doggedly pursued Radio Peking, wiping away any possibilities of the Chinese thinking that maybe it was a case of accidental interference.

Interestingly, the program material the Russians were using for this purpose consist-



Here's the Deutsche Welle transmitting station at Julich, West Germany. It's broadcasts in various Soviet languages are currently jammed.

ed of the inauguration of an entirely new "station" called Radio Mayak. Radio Mayak had 'round the clock music, news, and other special features in Russian and was intended for listeners within the Soviet Union and overseas. Using Radio Mayak to disrupt Radio Peking worked out so successfully that the Russians also put it into service jamming some of Radio Free Europe's Polish language programs!

Who Else Is Into This Game?

The United States has not used broadcast jamming as an instrument of peacetime national policy. Broadcasts from overseas are permitted free entry across our borders. Likewise, none of the western-alliance nations have used broadcast jamming on a permanent peacetime basis, although the British were said to have jammed Egyptian and Greek broadcasts during the Suez and Crete crises. The French were also suspect-

ed of jamming broadcasts from Algeria during the shooting war between France and Algeria in the early 1960s.

Another noteworthy instance of jamming, which drew much attention from listeners, took place in the mid-1960s. A propaganda station known as Peyk-e-Iran commenced broadcasts in Kurdish, Persian, and Arabic on three frequencies, 9.555, 11410, and 11697 MHz. For a long time, it had been assumed that these transmissions were coming from a Radio Berlin International transmitter in East Germany. However, further investigation revealed the Peyk-e-Iran was actually a covert function of Radio Sofia in Bulgaria.

It didn't make much difference where it came from, the fact was that not too much of it seemed to be getting through to its intended audience because of a bizarre jamming station on its frequency. Instead of the usual buzzing or grunts, the jamming station was

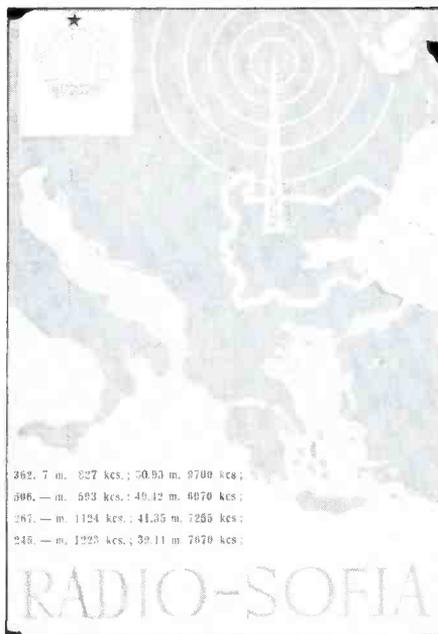
blasting Peyk-e-Iran with the repeated playing of a song called *Kiss Me Honey!* The song, rendered in English by a lady with a sultry voice and a German (sounding) accent, seemed to have been selected at random because it bore no political relevance to Peyk-e-Iran broadcasts. Eventually, after driving DXers up a wall trying to figure out what *Kiss Me Honey* was all about, the record must have worn out. It was thereupon replaced by something even *more* mysterious, a Spanish song played at the incorrect speed to make it sound like Alvin and The Chipmunks. It was later surmised that these prankish jamming broadcasts were coming from Radio Baghdad as an electronic countermeasure of the fun-loving Iraqi government. However, they were only providing this novel jamming service during times when Peyk-e-Iran was broadcasting to Iraq.

During the winter of 1969-70, an unusual case of jamming took place in England. At that time, a seagoing pirate broadcaster called Radio Northsea International was anchored in the offshore waters and operating on shortwave and also the broadcast band. The British Post Office (which licenses all radio transmitters in Britain) decided to take dramatic action against RNI. It went to the BBC and requested the loan of one of its portable jamming transmitters and, in a surprising act of frustration against the proliferation of offshore pirate broadcasters, the British Government jammed RNI's 1578 kHz channel!

The most curious threat of broadcast jamming in recent memory occurred in 1970, when a Canadian official suggested the possibility that Canada might well consider jamming American broadcasts as an aid to increasing Canadian nationalism. Nobody took the threat seriously, but it was eerie and unsettling to learn that such a concept might even be said aloud by a government official—even as a joke! Actually, in the Western Hemisphere, Fidel Castro appears to be the major proponent of broadcast jamming. His technique is not the crude buzzing noises of his Russian friends (although the equipment is there to do it). He prefers to establish his own powerful local broadcasting stations on frequencies where Spanish language broadcasts from Florida could get through to the Cubans.

Is Jamming Really Effective?

Deliberate radio jamming isn't always 100% effective, although it seeks to accomplish that end. It varies from place to place within any nation, although in major urban areas such as Prague and Sofia (where jamming transmitters are situated), it virtually kills all radio reception on those frequencies being jammed. Off in smaller communities and in the boondocks it's not quite as effective, but at least half of the programs being jammed are actually destroyed. On the other hand, that means about half of the broadcasts can still be received despite the jamming, and that's why broadcasters from the West continue their efforts to pierce the electronic Iron Curtain.



Radic Sofia, in Bulgaria, had its broadcast transmitters doing double duty as a covert propaganda station calling itself "Peyk-e-Iron." It resulted in one of the more interesting and novel types of jamming ever seen! Its transmissions were jammed by a crazy song repeated over and over!

Western nations have monitoring stations along the borders of Communist bloc nations in an effort to determine reception patterns in those areas. These stations carefully note the best frequencies to use for reception in their local areas at various times of the day, the idea being that such frequencies will probably be well suited for battling it out with jamming transmitters within several hundred miles of the monitoring station. For instance, if a monitoring station in eastern Austria determines that a certain frequency is being received well in that area at a particular time of day, then it's a good bet that the frequency could be used effectively for getting signals into southwestern Czechoslovakia and northwestern Hungary, that is if there aren't any local jammers in the area relying upon ground wave propagation.

Western nations also rely upon signal reports and QSL requests from within the target areas of their broadcasts to learn which programs and frequencies are getting through. Secondly, those who leave these nations and take up residence in the West are often good sources of information regarding which programs are arriving at their intended destinations. Not missing any opportunity to piece together as much information as possible on the success of jammed broadcasts, even when free-world broadcasters are attacked in *Pravda* and other Communist bloc newspapers, it's an indication that—jamming or not—the broadcasts are pushing through.

Not that the jamming nations aren't making efforts to make their work more effective. They are constantly striving to increase the potency of their jamming. Broadcasters take

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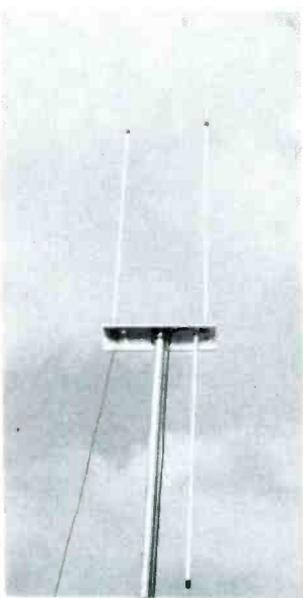
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Some shortwave broadcast stations pinch hit as noise jammers should the need arise!

anti-jamming steps to defeat the interference, and the ever-changing patterns of radio propagation require constant modifications in frequency and schedules. These factors require constant evaluation of jamming efforts, and corresponding modifications to those efforts. In many instances, several jamming stations at widely spread strategic locations are required to effectively blot out a single frequency. Jamming transmitters are frequently assigned an identification number, similar to a callsign, such as Y3 or NL. This identification is transmitted slowly in CW from time to time. The purpose of this is to let engineers involved in jamming know which jamming transmitters are effective in certain areas at specific hours, and which ones aren't effective.

As pointed out earlier, jamming doesn't always consist of random noises. It often consists of establishing a competing station on top of the station to be jammed in the hope that it will drown out the other station.

Anti-Jamming Efforts

Getting around jamming isn't easy, especially when the jamming is being done with extensive planning and creative thought behind it. Certainly, there isn't any accessory a person can attach to a receiver to filter it out.

One technique that has proven somewhat effective is brute force broadcasting. This consists of souping up the transmitter power and antenna gain to the point where the signals become so strong that it's very difficult to knock them out. Transmitting stations located near the borders of Communist bloc nations also serve to aid these efforts by being close to the intended listeners. The Voice of America shortwave relay station in Munich runs 100 kW, while Radio Free Europe in Biblis (Germany) is a quarter of a million watts! Voice of America's Munich medium wave transmitter is rated at 400 kW.

Economics is on the side of the broadcasters using this technique. For each Western transmitter whose power output is increased, many jammers have to reciprocate by likewise increasing their own power output. This is because no single jamming transmitter can be effective in all areas. It gets to be expensive trying to jam these high powered stations.

Another trick used to defeat jammers is known as saturation programming. Simply

put, it calls for the same program material to be fed out simultaneously on a large number of frequencies and from many different transmitting sites. This strains any jamming system to the utmost, and to the point where frequencies are only thinly covered by noise. Sometimes broadcasters use a dozen different transmitters to shotgun their message past the jammers and usually they manage to get 90% of their programs through.

One interesting technique calls for setting up a broadcast on a frequency directly adjacent to a Communist bloc station. The idea behind this scheme is that if the Russians or their friends put a jammer on the frequency, they will also zap their own programs going out over the adjacent frequency. This idea works best on paper, however, since most of the times it has been tried we have learned that there isn't the slightest hesitation in establishing jamming operations atop such a station, even if it blots out the Communist transmissions nearby. It's apparent that they're far more concerned with stopping incoming broadcasts than they are in sending out their own programs. One always wins over the other when there is an option to jam or not to jam!

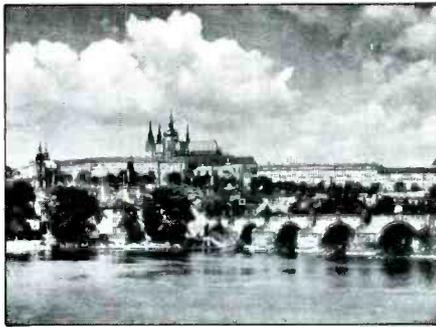
Another curious technique was tried for a while but abandoned. This was called “frequency jumping” or “frequency hopping.” The program would start out on one frequency and then, when the jamming started, the broadcast would seek out safe haven on another frequency, and then another, and yet another, etc. The problem here was that it turned into little more than a cat-and-mouse game played by radio engineers, with the Russians becoming increasingly adept at guessing where the broadcasts would turn up next. Sometimes they were waiting on the “new” frequency even before the broadcaster arrived there! Eventually, the Russians became bored with the game and simply established permanent jammers on all of the frequencies and alternate frequencies whether they were in use or not.

In the interest of getting this clutter off the international broadcast bands, the whole concept was scrapped. Of course, all of this was beyond the listeners' endurance, interest in hearing the broadcasts, and ability to figure out where the next broadcast would pop up! Oh well, it sounded like a good idea at first, anyway.

When it comes right down to it, probably the most effective and efficient anti-jamming technique used is *twilight immunity*. This clever idea takes advantage of certain behavior characteristics of the ionosphere.

Here's how it works. The span of frequencies the ionosphere successfully reflects varies from daylight hours to nighttime hours. During the day, the ionosphere does a better job with higher frequencies than at night. To the astute anti-jamming engineer, this immediately suggests the possibilities for applying these peculiarities of the ionosphere against the jammers.

A broadcast station located well to the west of a target area can actually blast through to the desired target area no matter



All of these shortwave broadcasters have, at one time or another, been accused of deliberate jamming.

what a jamming station in the middle may try to do. As darkness advances from the east, there comes a certain time when the transmitting station is in daylight while the jammer is in twilight and the receiving area is in darkness. While it's true that both the broadcaster and the jammer can punch a signal through into the target area, they can't necessarily do it on the same frequency.

The broadcaster's signal arrives at a portion of the ionosphere in daylight and is reflected down to the target area. But the spot of reflecting ionosphere between the jammer and the target area sits in darkness. A jamming signal on the broadcaster's frequency wouldn't be reflected by the nighttime ionosphere and the jammer is kaput. This takes place at dusk in Western Europe.

For several hours daily, relatively high daytime frequencies can be used for broadcasting to Eastern European target areas while jammers between the broadcaster and the target are stuck on the lower frequencies which react only to the nighttime ionosphere. It's a lost cause. For the jammer, it's something like being a 5'3" Center jumping for the basketball against Kareem Abdul-Jabbar—it just sails right over his head and there isn't a thing in the world he can do about it.

International Jamming Today

The Soviets have local jamming transmitters in practically every city in the USSR that has a population of 100,000 or more. These transmitters perform any touch-up jamming on undesirable signals that make it through the jammers established for skywave operation. There are more than 2,000 such skywave jammers in operation in the USSR, Bulgaria, Czechoslovakia, and Poland.

Amongst the current primary jamming targets are the Soviet language broadcasts of Deutsche Welle; the Polish, Bulgarian, and Soviet language broadcasts of the Voice of America; the Czech, Bulgarian, and Polish language broadcasts of Radio Free Europe and Radio Liberty; Russian and Polish broadcasts of the BBC; Czech, Yiddish, Hebrew, and Russian broadcasts of Kol Yisrael.

Right now, about the only intensive long-term broadcast jamming is done by the USSR and its satellite nations.

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Where It's At

Moscow, however, keeps its options open. Most of its shortwave transmitters can be used for broadcasting and also for noise or program material jamming. There isn't any doubt that all manner of broadcast jamming will be a part of the international shortwave scene for years to come, and you can hear it in action every day as you tune across any shortwave broadcasting band.

In the march of technology, we also note the use of *de facto* jamming of a sort in a station's own transmissions! Communications stations wishing to conceal transmission material from unwanted listeners and monitors obliterate their own transmissions by several methods of scrambling. Satellite TV material is under consideration for scrambling, and FM broadcasters use a technique called SCA (Subsidiary Communications Authorization) to broadcast background music and other program material that cannot be heard by listeners not having special receiving equipment.

Within the area of military operations, electronic countermeasures and counter-countermeasures are sophisticated sciences that are given careful and painstaking attention. This includes communications jamming as well as the jamming of radar, telemetry, guidance and navigation systems, control circuits, satellites, etc. This may include signals intended to cause malfunctioning.

In truth, every radio signal exists as a means of serving a useful purpose only as long as someone hasn't taken the notion that they don't want another person to make use of it. From that point on, the fate of the signal, and those who would use it, is in the hands of the jammer, his equipment, and his skill.

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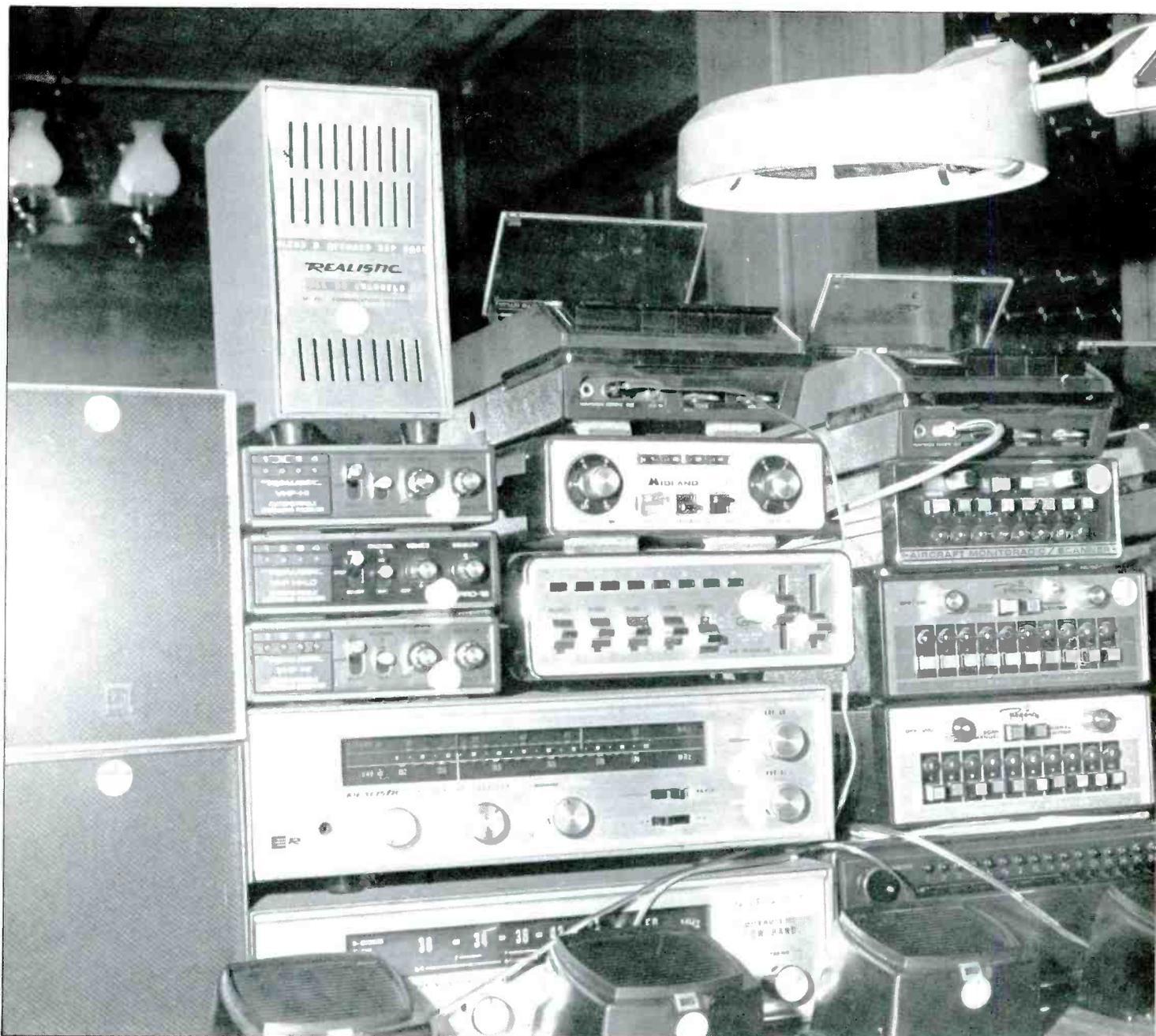
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Ten Ways To Have More Fun With Your Scanner!

Handy & Helpful Hints On How To Hear More!

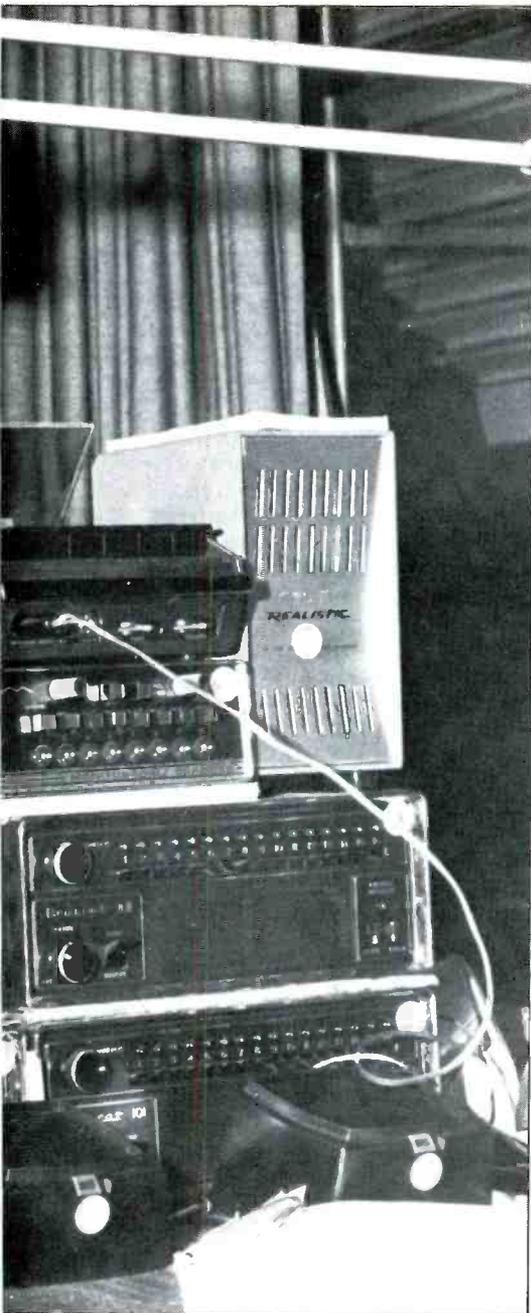
BY KCA6LX

By the time the first scanner was released for public use in 1968, I had already been tuning the VHF bands for five years, had already made 100 mistakes, wasted hundreds of hours on useless causes, and hundreds of dollars on unnecessary or poorly installed equipment. All of those things were easy, although this learning process continued even

after I purchased a scanner in 1968. From the many lessons I learned, I'd say that I was able to glean ten good ideas on getting the most enjoyment from my hobby. Glad to share them with you.

1. Proper Equipment & Installation. Many scanner users think that they can ignore some of the useful accessories now

available. I suppose they can, but camera buffs will tell you that buying a camera is only the first step in gathering together the equipment it takes to shoot some decent photographs. It's the additional lenses, filters, slave flash units, and other doodads that expand things beyond the basics. Ham operators add to their transceivers various things,



You've got a scanner? You find it enjoyable? Well then, why not multiply that enjoyment by two, three, or even more scanners? Here's an installation with about fourteen scanners, each with its own separate external speaker. Three cassette tape recorders are tossed in for good luck. Now that's what really enjoying the hobby is all about!

such as automatic keyers, RTTY/CW terminal units, antenna tuners, great circle maps, rotors, and more in order to get the most from their hobby. Folks with a scanner and some smarts never think that an unadorned scanning receiver is the ultimate way to approach the hobby.

Besides putting up an external antenna, which was designed to deliver signal gain (mounted as high as possible), scanner owners can greatly increase the number of stations they'll hear by adding things to their



This handsome layout is owned by one of our readers in the state of Washington. Note the Bearcat 300 scanner right in the midst of things, plus a tape recorder (upper shelf at the right) for keeping a permanent record of interesting stations monitored. Good luck with your operations there, I.H.! By the way, I.H. is licensed for operation on a number of different bands.

stations—RF preamplifiers, converters, de-scramblers, volume equalizers, external loudspeakers, frequency notch filters, and other similar devices. And don't overlook the coaxial feedline as a variable factor in how much can be heard via a scanner—it's the means by which signals traverse from the antenna to the scanner. Cheapie and bargain cable, or cable that has been sitting out exposed to the elements for a couple of years, simply doesn't hack it. I've found that by obtaining high quality, low loss, cable—and replacing it after three years' use—the transfer of signals from antenna to scanner takes place under the best possible conditions. Avoid using those solderless PL-259 connectors: they don't do their job as well as the standard soldered type connectors.

And while the keyboard programmable scanner has been heralded by scanner owners as the greatest invention since the discovery of guacamole dip, I'd like to say a few words on behalf of crystal scanners and tunable VHF receivers. If you can still locate an old VHF tunable receiver, buy it! Radio Shack, Lafayette, and Regency used to produce these in pre-scanner days and they're terrific for sliding around on the bands and hearing frequencies outside the band edges and in-between the frequencies which a programmable will pick up. Scanners which accept plug-in crystals are the ones I use for the couple of primary frequencies I like to monitor. I find these scanners less prone to image and spurious image pickup than their newer and more sophisticated (and expensive) big programmable brothers.

2. Have More Than One Scanner. Aside from the obvious advantage of having a standby or backup scanner available when one unit goes on the fritz, having two or more scanners on tap has something to be

said for it. Yes, they will expand your monitoring capabilities by giving you more than the number of frequencies you can hear with only one scanner. Yes, they will permit you to allocate one scanner for low band only, one for high or UHF band only, one for aircraft band only. Yes, you can set up one scanner only for frequency search or to concentrate its efforts only on certain specific high-interest frequencies during periods of emergency. Yes, you can place one scanner in the kitchen or TV room so that you can monitor a couple of priority frequencies when you're not seated at your main operating position. Yes, you can resist the temptation to lend an extra scanner to a friend since A) you'll probably never get it back, and B) as soon as it's gone, you'll immediately find at least three more reasons why you can't get along without it.

3. Have Accurate Data. Anybody who has had the sad experience of trying to rely upon publications the likes of *Police Call* type directories should be able to attest to the fact that they are far from being the answer to their prayers. I gave up on lightweight police/fire publications years ago when I realized that in most local areas there are localized or statewide publications that have more accurate information available. Check with local scanner dealers. They may offer you no more than a couple of mimeographed sheets, but chances are they'll have better data for your use. The November issue of *Popular Communications* had a listing of some of the better police/fire frequency publications available for local areas. Federal agency and aero band listings are best covered in CRB's registries.

4. Know Other Area Scanner Owners. No man is an island, or so it is said. Scanner owners should make efforts to get

to know others in their community who share their interest in VHF communications. Scanner dealers should be able to help you to connect with some of these people if you don't know how or where to begin. Some scanner shops even have a bulletin board where scanner owners can search out others of their ilk.

Knowing scanner owners in your community is a great way to swap frequencies and benefit from their experiences. You might even work out an arrangement whereby your small circle of friends has a telephone alert system when something particularly interesting pops up on a scanner frequency. You could also establish a program of all of the local scanner users systematically monitoring various public safety or industrial frequencies in order to accumulate highly detailed information on which stations are active in your area. This is often a very revealing process which turns up data that is quite different than you'll find in mass-market police/fire frequency books that seem to be prepared from incomplete, outdated, and inaccurate data.

Sharing any hobby is always more enjoyable and productive than pursuing it as a loner. I might also point out that I have not been at all happy with my (now expired) membership in at least one so-called national scanner organization which started up here in California almost ten years ago; I could write a book on all of the reasons. Suffice to say that while it has many good members, the ratio of wimps to worthwhile members is simply too overwhelming to let me feel that it is worthy of continued participation or interest from serious scanner users at the present time. Apparently, I'm not alone in my opinion.

5. Know What's On & Where To Listen For It. One approach to scanner use is to just sit there and let the signals roll in over you—taking them as they come. But I've found that it's a lot more productive to go out and creatively seek out things to hear. For instance, when I know the Governor is going to be in the area, I set up my scanners to receive those police, newspaper, radio/TV reporter frequencies that I feel will suddenly come alive with activity. When there's a forest fire in the area, I start listening on those frequencies that I know will buzz with a myriad of stations. A lost aircraft means that CAP and various other frequencies will become increasingly active for a few days. At the first inkling a major crime has taken place, I punch up lots of law enforcement frequencies that don't normally have much activity. This is what I call *creative scanning*, and I keep various lists handy with all of the special frequencies ready to go whenever they're needed.

6. Explore New Frequencies. Just because you've got a book that reports certain frequencies are in use in your area, it doesn't mean that the frequencies that aren't listed are not active. I like to program supposedly inactive frequencies into my scanners and check them out from time to time. I have a lengthy listing of "unused" public safety and

industrial frequencies on hand and I get around to checking each one every couple of months or so. Sometimes I just put the scanners on "search" and let them check out a whole swath of frequencies located in a particular band segment. Invariably, I locate stations I haven't previously monitored. Especially interesting are those times when I've been able to pick up distant stations that I count as somewhat of an accomplishment—police stations, fire stations, business users, federal stations—many of them 75 to more than 100 miles off into the distance. You'd be surprised at the many new and interesting stations you can hear if you just unlock yourself from those relatively few stations you're in the habit of monitoring.

7. Keep A Log. SWLs who listen on HF via communications receivers keep a log of stations monitored; yet this practice has never really caught on with scanner owners. I do not profess to know the reason why. Obviously, you don't have to log each and every transmission that comes through, but it is of definite value to keep a standing record or logging of new, unusual, mystery, or unidentified frequencies and stations. This should include the frequency, time, station identification, and general classification of station (police, fire, business, railroad, etc.). This will allow you to continue to check out the frequency in the future, as well as make it easier to recall the information when you're swapping data with other scanner users.

Another advantage is to help jog your own memory as to why you at one time had programmed into your scanner some strange frequency—the purpose of which has long since fled from your memory. Then, when you see that you've got 151.115 (or whatever) programmed but don't have the foggiest notion why, you can check back through the log and see what it was that caused you—in the dim past—to give it special attention. At that point, you can better decide if it pays to continue observing the frequency or just replace it with some frequency that has a higher excitement potential.

8. Collect QSLs. Another facet of listening on the lower frequency bands, which hasn't yet achieved its due on the scanner bands, is the collecting of QSLs, otherwise known as station verifications. A lot of people don't seem to realize that the majority of stations you can hear on a scanner (yes, even police stations) will verify your reception report provided a reply card is supplied for the station to return. I've collected many from police, fire, and other stations. Admittedly, it's a bit of an art which requires some trial and error to get a high rate of success, but it does add to the enjoyment of the hobby. I don't bother much with local stations, but it is nice when I can display QSLs from fire or taxi dispatchers a couple of communities into the distance—having dragged their signals out from under the various local dispatchers I can hear on those same frequencies. Aircraft QSLs have also been very easy to obtain, especially from airline companies.

I'm always surprised when I show my

QSLs to other scanner owners and they tell me they didn't think it could be done. Actually, it's easily done!

9. Specialize. While I do enjoy exploring the bands for new and interesting stations, I've found that there are certain types of stations that hold more total fascination for me than others. So, when it comes to those stations, I devote some extra time and effort to listening for them and finding out as much as I can about their operations. Whether it be federal stations, fire, railroad, aero, maritime, or other stations that can be monitored, certainly each person can select certain categories that are really "special." Devoting as much effort as possible into learning about them seems to double the enjoyment of hearing them. I can then answer questions about these stations from fellow scanner owners, as they can answer my questions about their specialties. Digging out information on my specialties includes monitoring, swapping information, visiting transmitter sites, taking photos, making lists, going to libraries, and other research.

10. Tape Record. Another way to enjoy the pursuit is to keep a cassette tape recorder handy while I'm monitoring. You never really know when something extra interesting is going to come blasting through the speaker, and a tape recorder gives you the opportunity to save it all for future analysis or showing off to friends. Maybe it's a dramatic fire, a stakeout, a capture, a search and rescue operation, or a *mayday* call on a maritime channel. I've got some really exciting things edited and put together on a demonstration tape. In fact, I played the tape for a neighbor a few weeks ago and the next day he went out and bought himself a scanner!

You can record right from the loudspeaker of the scanner, but that means that the audio quality isn't particularly good and you have to keep the room very quiet while you're taping. The telephone seems to always ring at just the wrong moment during such operations. With not too much effort, it's possible to pull the scanner's audio out and feed it directly into a tape recorder right from the speaker terminals of the scanner, or from its headset jack. You may have to do a little rewiring of the jack so that it doesn't cut off the audio going to the loudspeaker while taping is in progress. You can control the tape on/off by the switch on the cassette machine's microphone.

Another technique is to set up a cassette recorder with a VOX (voice controlled relay) so that you can monitor a favorite frequency while you're at work, sleeping, or otherwise not "on duty." The recorder will activate only when there is activity on the frequency.

Conclusion

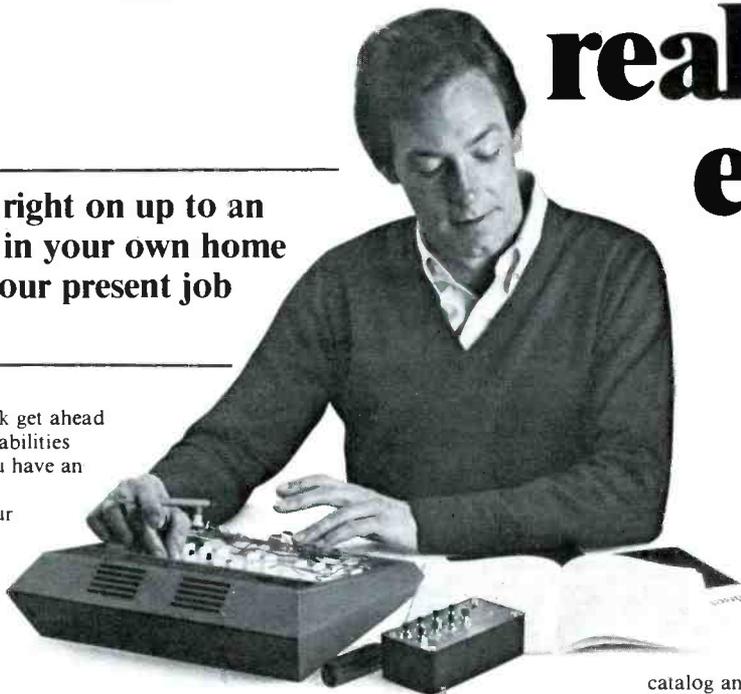
The conclusion is obvious; you are probably not getting as much enjoyment out of scanning as you might. Maybe you have another dozen or more ideas that I haven't covered here. If so, send them in to *POP/COMM* and share them with other monitoring enthusiasts!

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Opportunity.

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IN A CLASS BY YOURSELF

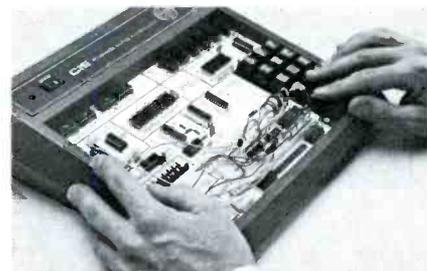
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ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

A seldom thought of, but nevertheless, highly desirable piece of equipment to have on hand during a civil emergency is a receiver that picks up weather and other information but doesn't require any power. Its batteries can't go dead because it hasn't got any batteries. The fact is, it doesn't require any power at all. Now *that's* a receiver for a survivalist; what's more, it's semi-portable, inexpensive, simple to put together, and can be carried in your pocket or backpack. It's sensitive enough to pick up plenty of broadcasters operating on the regular AM band. If things get rough and most of the broadcasters have to leave the air, it will still bring in a station in your area operating within the Emergency Broadcast System (assuming it's functioning).

The answer, of course, was known to Grandpa. It's a humble crystal receiver. It was one of the very first little receivers invented and, for all we know, it could very well be one of the last ones in use when all other communications equipment takes the deep six. The beauty of it is that it's strictly passive in its operation and doesn't require the slightest bit of power to get it operating; it simply detects any signals drifting past the antenna and reproduces them. Okay—so it's not a Drake R-7A, or a Kenwood, or a Sony, or a Panasonic; but, on the other hand, even they require electricity to operate while this thing won't. That's something to be said for it.

There are crystal radio kits available that can be put together in a few minutes. Radio Shack has one (Cat. #28-219) that sells for about \$5 (that's for everything, including the earphone). Their catalog aptly comments that it's a radio that "plays forever."

Schematics and instructions for *scratch* building crystal receivers aren't at all hard to come by should you want to try that route for obtaining one. Most books showing a collection of schematics generally offer several you can build. So, if you've already got some of these handy books on your shelf, you might wish to check through them.

If you don't have any books along those lines, check out the book *Radios That Work For Free* by K.E. Edwards. If your local library doesn't have a copy, check with the publisher: Hope & Allen Publishing Co., P.O. Box 535, Belmont, CA 94002. Actually, it's a good reference source for a number of different "unpowered" radios that you might want to have on hand. Plenty of information on how to build them is included.

Maybe you'd like to duplicate a little crystal receiver I built very successfully a while back. I'll pass along the schematic, a wiring pictorial, and a brief description.

My set is housed in a 1 1/4" x 2" x 3/8"



Radio Shack offers this crystal receiver for only a few dollars. A good survival product.

plastic pin or jewel box. Two 3/8 inch holes are reamed in one end of the box with a rat tail file and plastic phone jacks inserted. You can do it with a single hole for a miniature phono jack if that's what your headphone is equipped with.

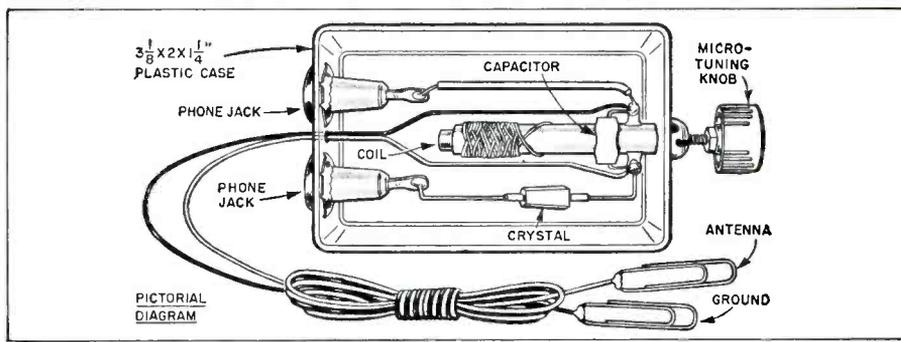
Between these holes is a single 1/8 inch hole through which the antenna and ground leads pass. These flexible insulated wires have paper clips soldered to the ends for connecting the set to an antenna. I found that those clips that are "frictioned" with lots of little grooves get a better grip on things than the smooth type clips. An antenna can be anything, ranging from the finger stop on a dial type telephone to a chain link or barbed wire fence. A ground probably won't be needed except in outlying areas.

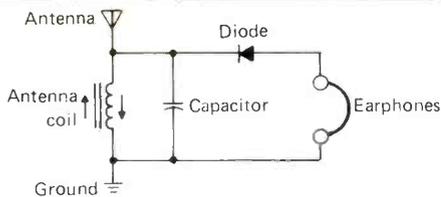
Ream a 3/16 inch hole in the opposite end of the plastic box and, into this hole, snap a micro-tuning type ferrite antenna coil. Then, attach a 4-40 threaded plastic knob to the coil screw, which provides precision tuning that won't drift once set to a station.

Most U.S. and Canadian stations operate below 1200 kHz, so a 150 pF ceramic capacitor is soldered across the coil lugs if you want to also tune from 1200 to 1600 kHz. In large city areas where the powerful stations (with some exceptions) are between 540 and 1200 kHz, use a 250 pF ceramic capacitor. But with no capacitor, the set will work and will tune outside of the upper frequency edge of the broadcasting band. While that isn't going to be of any particular value to you, it can't hurt either.

The detector I used in my own receiver was an old germanium type 1N81, but this shouldn't be a very critical component. Any equivalent type (such as an Archer 276-1123) can be substituted.

Good reception and volume depend upon sensitive headphones, so use conventional magnetic or Alnico phones with a resistance of 2000 ohms or more for best results. Without a power on/off switch, this set just doesn't quit. It will bring in stations from hundreds of miles away. It may well be ad-





Crystal Receiver—Parts List

- 1 Plastic box, original measured 1½" × 2" × 3¼".
- 1 1N81 or equivalent germanium crystal detector.
- 1 150 pF (or 250 pF—see text) ceramic capacitor.
- 1 Micro-tuning type ferrite antenna coil.
- 1 4-40 threaded plastic knob.
- 1 Magnetic or Alnico single or double headphones, 2K ohms or more.
- Flexible insulated antenna and ground lead wires, 2 paper clips.

visible to consider having just such a set handy in the event of loss of emergency power or breakdown of equipment, or in the event you have to move and can't bring the equipment with you.

Mailbag

The letter carrier has been bringing me some interesting comments and questions from readers. I'll try to get to some of them here in the column from time to time. If you want a personal reply, however, please include an SASE.

E. J. McClintock, who says that he's "located in the wilds of Michigan's upper peninsula," asks about waterproofing, dirtproofing, and dustproofing equipment. He's particularly interested in the use of a hand-held transceiver that he takes "into the field" and, during the warm months, onto a boat. But his home station equipment seems to collect lots of grit and dust, and that's as annoying as when the water surrounding the boat splashes onto his hand-held.

The hand-held can be protected from the elements by dropping it into a clear plastic ziploc type bag (like the one produced by Baggies) for food storage. Get the larger "utility" size. Cut a hole for the antenna to protrude and close up the whole thing with the ziploc seal. That way the set is protected from water and dirt and you can still get to the push-to-talk button with ease; also, the microphone and speaker will still be functional despite the covering.

For the base station, get some large sheets of clear plastic at a store that sells paint. They sell it for use as drop-cloths for ambitious amateur house painters. This stuff is pretty thin and you can see through it. Cover over your base station equipment while it's not in actual operation in order to keep things dust-free. Fact is that even with the equipment operating you may be able to leave it in place, with the microphone left outside the covering for ease of operation. Solid state equipment doesn't generate enough heat to cause any problems, but if you've got older tube type equipment, then I wouldn't suggest leaving the dust cover in place while it's in operation. Once you've got the transmitter, receiver, or scanner set to where you want it, there shouldn't be any need to twiddle with anything under the dust cover, so just leave it covering the gear!

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May We Recommend

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



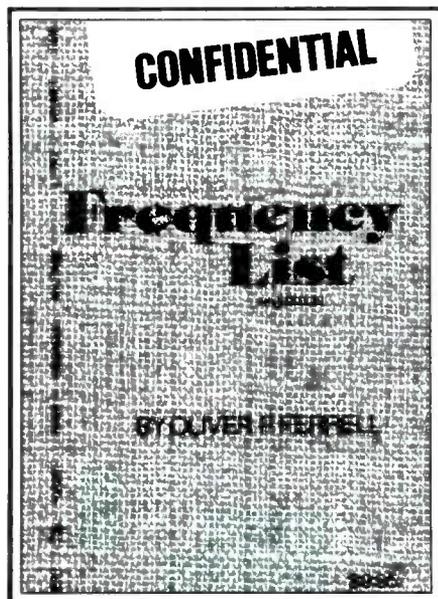
The North American Short Wave Association, P.O. Box 13, Liberty, IN 47353. NASWA has been around since 1961 and now has well over 2,000 members. Their specialty is short wave broadcast (SWBC) coverage and they're good at it. Each month they publish *FRENDX*, a really good 56 page publication filled with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



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

PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Confidential Frequency List

Those of you who have communications receivers and like to explore some of the more fascinating communications frequencies probably have used Perry Ferrell's *Confidential Frequency List*. Perry has now brought out his revised and expanded 5th Edition of this useful book, and it's bigger and better than the highly acclaimed 4th Edition. The 224 page book, in fact, has 30% more listings than the previous edition and even includes a call sign/frequency cross-reference section in this edition. Covering 4 through 28 MHz, its 7,500 listings covers military stations of many nations, embassies, aero, facsimile, Interpol, coastal, time signals, broadcast feeder stations, emergency networks, press, overseas telephone; these stations may be monitored on AM/SSB/CW. It's quite a unique reference source and even contains the latest WARC changes! Three years in preparation, its in-depth coverage makes it a must-have for all owners of communications receivers.

The Confidential Frequency List, 5th Edition, by Perry Ferrell, is published by Gilfer Shortwave, P.O. Box 239, Park Ridge, NJ 07656. The price within the USA is \$9.95 (includes Book Rate mailing) — shipping via UPS is \$2.05 additional. Outside the USA the book is US \$10, which includes Book Rate mailing. Registered Airmail outside the USA is \$17.30 (total price including book and mailing).

Gilfer will be happy to send POP'COMM readers their interesting catalog showing useful publications and equipment of interest to the serious DX enthusiast. For further information, contact Gilfer directly or circle number 101 on the reader service card.

Voltage Spike Protector

Radio Shack, a division of Tandy Corporation, offers protection against potentially damaging power line voltage surges. The Archer® Voltage Spike Protector (61-2790) is available for \$9.95 at Radio Shack stores and participating dealers.

The Voltage Spike Protector absorbs voltage transients associated with power line surges, yet does not interrupt the normal current flow. This helps protect components within computers, televisions, stereos, and other electronic equipment.

The Voltage Spike Protector plugs into any 15A, 125V outlet, and the protected equipment plugs into it. For further information, contact the Tandy Corporation/Radio Shack, 1800 One Tandy Center, Ft. Worth, TX 76102, or circle number 102 on the reader service card.



UHF Transceiver

ICOM announces another addition to its rapidly growing UHF line.

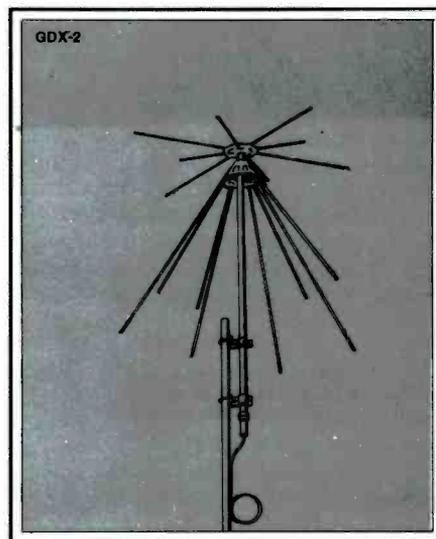
Now in addition to the IC-451A, IC-490A, and IC-4AT, the IC-45A provides FM mobile coverage of 440-450 MHz. Major features include:

- Small size — 2"H x 5 1/2"W x 7"D
- Green LED readout (easy to read in bright sunlight)
- 5 memories
- Priority channel
- Band and memory scan with automatic resume
- Memory backup provisions
- 1 MHz up button for quick QSY
- Variable duplex offsets
- Same size and matching styling to the IC-25A



- Touchtone microphone included
- Frequency coverage 440-449.995 MHz

See it at your local authorized ICOM dealer or write or call ICOM America, Inc., 2112 116th Ave. N.E., Bellevue, WA 98004 or 3331 Towerwood Dr., Suite 307, Dallas, TX 75234, or circle number 103 on the reader service card.



Monitor Antenna

TET Antenna Systems announced its new Model GDX-2 discone monitor antenna. It gives excellent reception over the frequency range 40-500 MHz with a low angle pattern. The unique 12 element design acts like a full disc and cone but has much less wind resistance.

The GDX-2 directly matches 50 ohm coaxial cable without need for a transformer or balun. The cable connection is at the bottom of the mounting rod in the exact center of the antenna and below the longest cone elements so there is no unwanted coupling between cable and antenna. The antenna is 7 1/2' high, 9 1/2" diameter, and weighs 7 lbs. The price is \$69.95.

For more information, contact TET Antenna Systems, 1924E W. Mission Road, Escondido, CA 92025, or circle number 106 on the reader service card.



VHF Antenna Rotator

Automatic Golden Colorator, Model 9510, is the newest generation of Channel Master automatic antenna rotators. This unit features 16 distinct improvements over Model 9512 which it replaces.

Changes in the 9510 drive system provide for greater durability and resistance to high winds that often cause other rotator housings to crack. The control console has also been redesigned for improved appearance as well as easier and quieter operation.

Improvements to the drive system include a new drive housing that is shorter in length to redistribute forces over a stronger area and allow the drive unit to be mounted inside antenna tower sections. The mounting stud area of the housing has also been strengthened by moving it to the narrow wall of the casing where it can be supported by the internally mounted main plate. The higher location of the mounting studs also results in better support for the upper bearing ring, reduced flexing, and maximum support for both mast and tower mounting. Antenna mast support has been improved by adding crossed ribs in high stress areas and increasing the number of ribs from four to six on the steel drive shaft.

The bottom cover now hinges toward the mast to provide maximum accessibility to the terminal board for easier installation. The new captive-screw closure system eliminates lost screws as well as being more reliable than snap-clip type closures.

Additional drive system features include a heavy duty rotor motor designed to handle large, fringe area antennas while producing enough torque to break through heavy ice loads. Built-in steel thrust bearings move heavy loads smoothly and eliminate the need for accessory bearings. Heavy duty precision-cut gears will not slip, bind, or break and provide positional accuracy to within one degree. Wind-tested brake pads hold the antenna in winds up to 70 mph.

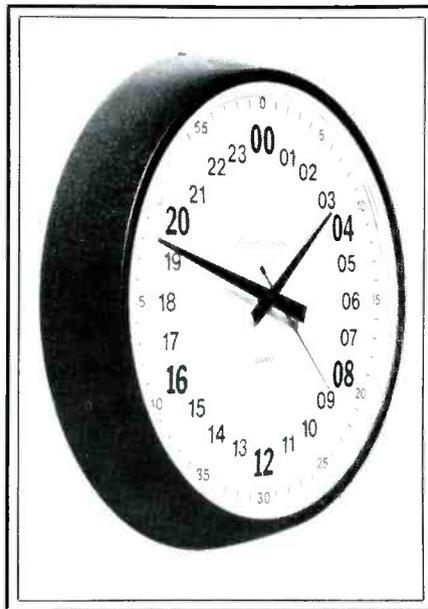
Improvements in the automatic control unit include a redesigned and more compact console. The upper and lower housings now interlock on all four sides for increased durability and a more solid feel. The "end of rotation" stop is also now snapped into the lower housing to prevent its being forced out of location.

Rotation of the recessed knob is now smoother and requires less effort through the use of a single, trapped compression spring which replaces three loose flat springs. Performance of the switch has been improved by using a relay contact design instead of the former knife switch.

The overall noise level of the control unit has also been considerably reduced. This has been accomplished through improved design and the use of a foam polyurethane sound dampener and a plastic fast gear.

Finally, for easier installation, new single-length conductor connections eliminate the need to cut lead-in cable conductors to different lengths. Cable strain relief is also simpler and offers an improved grip.

Suggested list price for the Channel Master Golden Colorator is \$79.95. For more information, contact Channel Master, Ellen-ville, NY 12428, or circle number 116 on the reader service card.



Military Time Format Wall Clock

Benjamin Michael Industries introduces the newest addition to its line of professional quality Military Time format clocks. The Model 973A features quartz accuracy and a huge 12" dial which allows excellent visibility even in large rooms. This unit is perfect for communications rooms, flight operations offices, or anywhere that military time is required for accurate, non-ambiguous logging or control.

A unique, intelligently designed dial simplifies the clock face and helps eliminate the interpretation errors often associated with 24 hour clocks. Battery operation eliminates the need for an unsightly power cord and, more importantly, provides immunity to power line failures.

Specifications

Format:	24 Hour Military (973A) 12 Hour (972A)
Oscillator:	32.768 kHz Quartz Crystal
Accuracy:	15 sec/month Max Error

Power Source: A single C cell will operate this instrument for over one year.

Dimensions (nominal)
Diameter 12 inches
Depth 1 3/4 inches

For more information, contact Benjamin Michael Industries, 65 E. Palatine Rd., Suite 105, Prospect Heights, IL 60070, or circle number 111 on the reader service card.



Receive-Only Program For Morse Code And RTTY

CIPHER89, a new computer program designed for the Heath/Zenith H-8 or H-89, is now available for shortwave listeners. COMMSOFT's CIPHER89 is a receive-only program for Morse code and radiotele-type transmissions originating from such sources as press services, embassies, ship-to-shore stations, and Amateur Radio stations. The program features Baudot and ASCII operation up to 1200 baud and Morse code operation from 4 to 99 words per minute.

CIPHER89 is heavily graphics oriented with many on-screen menus to help the shortwave listener identify the format and nature of received messages. Histogram and map modes can be used to correlate data against previous intercepts and to identify light encryption. Received data can be saved on disk and sent to a line printer.

The program comes with an extensive instruction manual which contains chapters covering many aspects of shortwave listening. Such subjects as how to recognize various types of code and the effects of propagation on shortwave signals are just two examples of what can be found in the manual. In addition to the manual, an audio cassette tape is included with the package. The tape contains recordings of many types of signals the shortwave listener will encounter.

CIPHER89 requires a Heath H-8/H-19 or H-89 computer with 32K of RAM and one disk drive. The program runs under the Heath Disk Operating System (HDOS). A hardware interface, such as the COMMSOFT CODEM, is needed to connect the shortwave receiver to the computer.

The complete software package consists of the CIPHER89 disk, an 87 page illustrated manual, and cassette tape. The price of the package is \$99.95. A combination package, which includes the program plus a CODEM, interconnect cable, power supply, and shipping is available for \$249.95. For more information, contact COMMSOFT, Inc., 665 Maybell Avenue, Palo Alto, CA 94306, or circle number 109 on the reader service card.

Don't Be Left Out in the Cold
with the Russian Woodpecker

GET A MOSCOW MUFFLER™

Another first from AEA. The Woodpecker Blanker, WB-1 really works. This unit effectively blanks the pulsing interference of the Russian Woodpecker. Two versions are available, the WB-1 for use with communication receivers and WB-1C for use with all popular transceivers.



This extremely useful accessory is designed for direct insertion between your receiver (or transceiver) and the antenna. It is both MORE EFFECTIVE than I.F. type blankers and requires NO MODIFICATIONS to your receiver! The unit operates from a 13 VDC \pm 2 VDC power source at less than 575 mA. (AEA AC wall unit AC-1 will operate the blanker.)

The blanker works well on both CW and SSB modes that are being interfered with by a woodpecker. Controls on the front panel include; four push button switches, a synchronize control and a width control. The WB-1 also features a low-noise untuned broadbanded 6 db gain pre-amp which can be selected with or without the blanker enabled. The WB-1C uses the same circuitry but includes a carrier operated relay (COR). This provides protection to the receiver section during transmissions from the attached transceiver.

For more details, write for our latest catalog or visit your favorite dealer.

Prices and Specifications subject to change without notice or obligation.

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Breakthrough!

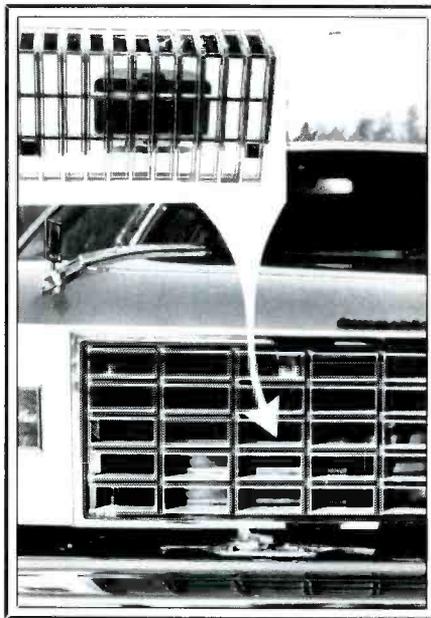
CIRCLE 147 ON READER SERVICE CARD

Now You See It, Now You Don't

Hidden behind this grille is the Whistler remote-mount Radar Eye speed radar detector. The detector, designed to look like a standard rectangular driving light, mounts comfortably behind the grille of almost every car on the market. The driver himself is reminded of the unit only when the compact, under dash control console reports police speed radar. Inside the cockpit, the cigarette pack-sized console beeps and flashes in relation to the distance from the radar. The closer the speed radar, the faster the beep and flash rate. The control console attaches easily to the "driving light" receiver head by a main connecting cable.

The receiver head also mounts in front of the car's grille. To the observer, the effect is of a single driving light. An added matching dummy light will simulate a pair of driving lights on the front of the car.

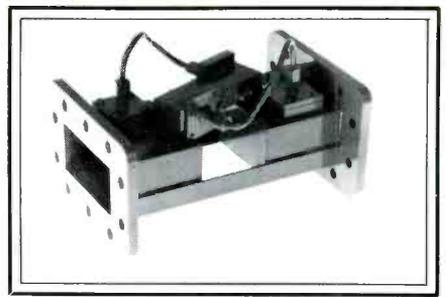
The remote-mount speed radar detector is one of three radar detectors manufactured by Whistler. Whistler of Littleton, Massachusetts, is the engineering leader in high-performance speed radar detectors. For more information, contact Whistler, 410 Great Rd., Littleton, MA 01460, or circle number 115 on the reader service card.



Earth Station Filter Protects LNA

Model 3716 (LNA) bandpass filter passes the 3.7-4.2 GHz, suppressing out-of-band terrestrial carriers. The filter features CPR waveguide flanges for WR 229 waveguide. The filter is mounted between the earth station low noise amplifier (LNA) and the feed horn; 2 and 6 GHz carriers (the most common offenders) are suppressed 50 db min.

Price and delivery are \$445 and 2 weeks, respectively. For more information, contact Emily Bostick, Microwave Filter Co., Inc., 6743 Kinne Street, East Syracuse, NY 13057, or circle number 110 on the reader service card.



Multi-Purpose, Wireless Security System

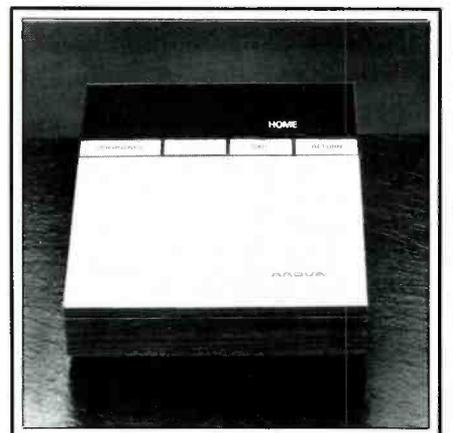
Anova Electronics announces the Model 9000 Protection Center, the first multi-purpose security system of its type to combine an intrusion alarm/burglary deterrent, fire & smoke alarm, personal/medical emergency alert, and utility failure alert—each with its own distinct alarm sound. Unlike most conventional products now available, the Anova Protection Center requires no special wiring and can be installed quickly.

Four basic modules are supplied with each unit, including two transmitters for window or door intrusion, one for personal emergency, as well as a remote alarm. Unrestricted exit time is provided after activation of the intrusion alarm system, and variable re-entry times of fifteen, thirty, or forty-five seconds can be selected. A battery backup feature insures continuous operation during power failures.

When utilized as part of the Anova Master System, the Protection Center alarms will activate the Telephone Center's auto-dialer and pre-recorded emergency message functions. In conjunction with the Control Center, the Protection Center triggers interior/exterior lighting and additional alarms.

Offering highly sophisticated electronic design, the Anova Protection Center has been engineered for optimum functional simplicity, with only the most frequently used controls visible on the front panel. To accommodate the special requirements of a variety of home or small business environments, extra Protection Center modules may be purchased.

For more information, contact Anova Electronics, 3 Waters Park Dr., San Mateo, CA 94403, or circle number 112 on the reader service card.



RTTY

THE EXCITING WORLD OF RADIOTELETYPE MONITORING

It's always a thrill to finally switch on the rig after installing a new antenna—an antenna that's guaranteed to outperform the last "skyhook." But there is a genuine problem. What is the best antenna to have for RTTY commercial reception?

Well, of course, there is no ideal antenna, only compromises. So let's review all of the tradeoffs and system considerations in selecting antennas. Right up front, a typical Ham band antenna is a very poor choice for reception of commercial news networks due to the narrow bandwidth inherent in the overall design. Ham, quads, or yagis have a superior gain *only* in the Amateur bands and gain will drop off rapidly outside the designed bandwidth. This is the first problem. If commercial RTTY news transmissions can be from 3 to 30 MHz, how can we select a particular antenna? Our choices narrow down to a diverse group if we assume that broadband reception is a must. Long wire, verticals, active, and log periodics (in order of increasing costs) tend to be broadband and usable for commercial RTTY news.

Antenna gain is the end goal in selecting one of the above antenna options. The design of a simple tunable vertical allows reception from 3 to 30 MHz, but no usable gain. Keep in mind commercial RTTY transmissions are point-to-point in design and directional antennas are used throughout. If the listener is not in the transmission path, the signal is usually quite weak. Here is where antennas with gain are most useful. Focusing the direction of the antenna is one method of achieving a stronger signal at the expense of radiation in other directions. If cost is no object, try a full size log periodic antenna. Excellent forward gain, greater than 7 dBd over a very wide spectrum, is one of its finer characteristics. Of course, with excellent gain and directivity, a rotor is necessary.

However, a simple low cost tunable long wire has satisfactory gain also. The gain typically with a long wire can be 3 dBd at a length of four wavelengths long (shorter lengths are effectively created by an antenna tuner). This gain raises linearly to 5.5 dBd at 7 wavelengths long.

The wave angle is an area of importance since DX will tend to favor a long angle radiation pattern. This is where the long wire excels, since a very low angle is achieved very quickly as the overall length increases. This long wire is a favored antenna with commercial RTTY monitors, given its simplicity and ultimate flexibility.

A nice complement to the long wire is the tunable vertical antenna, since the wave front may be vertically or horizontally polarized and is unpredictable. I have an antenna change over switch, which is very useful as

```
QRA QRA QRA DE GBU32 GBW34B GDW42A GIC26B GIC29B GIC30B GIW37B
GIY38B GLK42 THE ASSOCIATED PRESS LONDON RYRYRYRYRYRYRYRYRYRYR
QRA QRANQRA DE GBU32 GBW34B GDW42A GIC26BLGIC29B GIC.0B GIW37B
GIY38B GLK42 THE ASSOCIATED PRESS LONDON RYRYRYRYRYRYRYRYRYRYR
```

Here's an RTTY test slip used by AP in London as it looks in hard-copy printout version.



The HAL Telereader is a practical and relatively inexpensive way of copying CW and RTTY signals.

the FSK RTTY signal fades rapidly. This antenna switch proves very useful when stalking the faint tones (see the Dec. POP'COMM story on diversity monitoring). Highly elaborate antenna phasing schemes are usually not worth the trouble, unless there is a specific frequency used by UPI or AP over a long period of time. This is risky business, as commercial RTTY could (and usually does) change frequency, leaving a monument to that frequency!

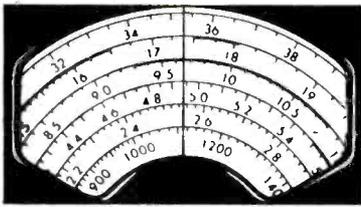
So let's stay with the broadband antennas for RTTY DXing in spite of the decreased gain here. Active antennas are easy to handle, offer gain, and are a good choice for an apartment dweller or where there is limited space. However, if one has the room, a long

wire is a better choice considering the cost-performance tradeoffs.

When propagation conditions are good, low power news transmissions thousands of miles away are heard with a simple wire antenna! Remember, Frequency Shift Keying (FSK) will offer a stronger signal when compared to most other forms of modulation, such as AM, SSB, and even CW (under identical conditions). The next time you curse out that strange RTTY signal next to your favorite shortwave AM voice station, go to your local radio emporium and buy an RTTY reader to see what you're missing. You'll find a world of news transmissions, money exchanges (yes, third world band transfers!!), and unreadable military data.

I find a never-ending world of surprises with commercial RTTY; but please, plenty of patience is needed as up to date schedules are challenging. I am presently experimenting with a broadband, low Q sloper antenna to see how this will stack up against the others. Also, when these tests are through, I'm eyeing a log-periodic package to have fun with and go after the faint ones with! Let's look at some of the major news networks this month. These are the non exotic, but reliable and somewhat apolitical services. This, of course, is only a subset of what's actually being transmitted. Verified listings would include:

Frequency	Location	Time	Language	Shift	Baudot Rate	Normal/Reverse Phase
UPI - United Press International						
19520.0 MHz	Victoria Island, Hong Kong	1544 GMT	English	425 Hz	50 baud	Reverse
9895.0 MHz	Victoria Island, Hong Kong	1940 GMT	English	425 Hz	50 baud	Reverse
AP - Associated Press						
14974.0 MHz	London, England	1854 GMT	English	425 Hz	50 baud	Reverse
9349.0 MHz	London, England	0337 GMT	English	425 Hz	50 baud	Reverse
Reuter - Reuters Ltd.						
18334.0 MHz	London, England	1604 GMT	English	425 Hz	50 baud	Reverse
14515.6 MHz	London, England	0705 GMT	English	425 Hz	50 baud	Reverse
ANSA - Agenzia Nazionale Stampa Assoziata						
20730.0	Rome, Italy	1900 GMT	English	425 Hz	50 baud	Normal



COMMUNICATIONS CONFIDENTIAL

BY HARRY L. HELMS

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

Many contemporary receivers include some provisions for longwave reception. Longwave is often defined as "that portion of the radio spectrum from 10 to 540 kHz," and we'll use that definition here. Most receivers that cover longwave do so from 150 kHz and up, so we'll discuss that segment this time. Next month we'll look at activity and receiving equipment for the 10 to 150 kHz range.

Your first attempts at longwave reception may be frustrating. Power transformers, electrical machinery, neon signs, and other such devices radiate noise throughout the longwave spectrum. If you're located near such devices, the only solution may be to try listening from another location using a portable receiver! Antennas can be a problem, too. A directional loop antenna for longwave, such as the ones manufactured by McKay-Dymek and others, will be a big help. However, the old-fashioned longwire can be a reliable performer under most conditions. The key to longwave reception is persistence, and the current cold winter nights are ideal for tuning below 540 kHz.

You'll find the 200 to 405 kHz range filled with a variety of aeronautical beacons. These stations repeat their call signs continuously in slow Morse code. However, their call signs are abbreviations for the airports and cities where the beacons are located and do not follow the international call sign allocations. Here are some of the more commonly received beacons, with their frequency, call sign, and location:

kHz Call and Location

206	GLS, Galveston, TX
209	LGA, LaGuardia Airport, NY
215	PWM, Portland, ME
216	CLB, Carolina Beach, NC
222	PMO, Norfolk, VA
224	BGN, North Platte, NE
227	SFO, San Francisco, CA
230	ABQ, Albuquerque, NM
242	GM, Milwaukee, WI
248	MO, Mobile, AL
252	NLO, New London, CT
254	CCZ, Pittsburgh, PA
257	MLB, Melbourne, FL
260	HKS, Jackson, MS
263	OGD, Ogden, UT
266	ATL, Atlanta, GA
275	RF, Rockford, IL
281	SGK, Knoxville, TN
291	MH, Brooklyn, NY
304	ROW, Roswell, NM
320	OM, Omaha, NE
323	BTV, Burlington, VT
326	PQO, Phoenix, AZ
332	DC, Washington, DC
332	LAX, Los Angeles, CA
344	JA, Jacksonville, FL
350	ME, Chicago, IL
359	BO, Boise, ID
362	EZB, Oakland, CA
365	FT, Fort Worth, TX
371	GT, Great Falls, MT
375	DW, Tulsa, OK
379	EWD, Denver, CO
382	BOS, Boston, MA
388	DT, Detroit, MI

Additional CW stations can be found from 415 to 490 kHz. These are coastal stations that communicate with shipboard stations. These stations and their operation are similar to coastal stations found on shortwave. In fact, many shortwave coastal stations also have a longwave outlet.

A fascinating frequency is 500 kHz. This is an international distress and emergency frequency. Another interesting frequency is 512 kHz, which is a calling frequency. Stations meet on 512 kHz and then move to other frequencies to conduct their business. Both 500 and 512 kHz will usually be humming with activity during the evening and night hours.

There are more CW aeronautical beacon stations to be found just above the upper end of the standard AM broadcast band (1600 kHz). However, these have been declining in recent years. Here's a list of some of those still active:

1608	VSA, Villahermosa, Mexico
1610	CTG, Cartagena, Columbia
1613	RAB, Rabinal, Guatemala
1618	TUL, Tulancingo, Mexico
1620	EBG, El Bagre, Columbia
1620	NLD, Neva Laredo, Mexico
1625	TIKK, San Jose, Costa Rica
1630	AUR, Guatemala City, Guatemala
1635	PPN, Popagua, Columbia

As complete a listing of beacons in North America and overseas as you'd ever hope to see is contained in a great reference directory called *The Beacon Guide*, compiled by H. John Clements and edited by Ken Stryker.

There are hundreds of other beacons; our list only contains a sampling.

RABINAL, GUATEMALA
C.A.

RAB

1613 KC
1000 W.

6255 FT. ELEV.
140 FT. TOWER

CONFIRMING YOUR REPORT
29 Jan 1967

Here's a QSL from beacon "RAB" in Guatemala. It's a beacon that has been widely monitored throughout the U.S.A. and Canada. QSL reproduced from *The Beacon Guide*, by Clements and Stryker.

GRONLAND

XPM50

98.5 kc

XPM50 was an LF station that surprised a listener with a printed QSL card! Makes you wonder how many reception reports they have there in Greenland!

RUGBY RADIO STATION

GBR

RUGBY, ENGLAND

THIS WILL CONFIRM YOUR RECEPTION OF
RADIO STATION GBR ON 16 KCS. AT
0957 GMT ON 25th July 1979

POWER: 50 W WATTS, ANTENNA L.W. Broadcast

REMARKS: —

Signed: *[Signature]*
OPERATOR: GBR

GBR is a VLF station transmitting time signals from England. This QSL was received by Tom Kneitel a while back.

er—two DXperts on low frequency DX. The 100 page book is a comprehensive listing of more than 5,500 Western Hemisphere marine, aero, private, and offshore beacons. It's available from Century Print Shop, 6059 Essex Street, Riverside, CA 92504-1599. We recommend this book highly to any listeners interested in these stations.

Cordless Phones

I've received a number of letters asking about tuning in on cordless telephones. The base stations appear to be most active on 1695, 1725, and 1755 kHz while the handheld remote units are on 49.83, 49.845, 49.86, 49.875, and 49.89 MHz. Operation is duplex, meaning that both units continuously transmit while in use. This way, both parties can talk at the same time in normal conversational style. Transmissions are made using narrow-band FM or phase modulation and can be received on standard scanners and communications receivers.

Cordless phones supposedly are short-ranged due to their low power. Don't you believe it! Often these units run higher power than the FCC allows due to loose quality control (many such units come from Taiwan or Korea and are not comparable in quality to Japanese products). The result is that you could find yourself eavesdropping on conversations a couple of miles or more away. And, as always, it's amazing what people will say when they don't think anyone else is listening!

Listening Reports

Here are this month's listening reports. All frequencies are in kHz and all times are GMT. We'd like your reports here; send them to "Communications Confidential," POPULAR COMMUNICATIONS, 76 North Broadway, Hicksville, NY 11801. Please enclose an SASE if you'd like a reply. All loggings this month are from your editor and Stewart MacKenzie, longtime director of The American Shortwave Listener's Club. For a sample of their really excellent bulletin, send \$1.00 to ASWLC, 16182 Ballad Lane, Huntington Beach, CA 92649. And now for this month's reports . . .

2670: NMC, U.S. Coast Guard, San

Francisco, CA, notice to mariners, read by woman, at 0205. (MacKenzie, CA)

4279: CW "numbers" station with "TTT" opening 0300, into coded groups. (Helms, NY)

5810: Four digit Spanish "numbers", woman's voice at 0335. (MacKenzie, CA)

6401: EAD, Aranjuez Radio, Madrid, Spain, CQ marker at 0210. (Helms, NY)

6506: NMN, U.S. Coast Guard, Portsmouth, VA, weather broadcast in SSB at 0420. (MacKenzie, CA)

7605: Female speaker repeating what sounded like "victor eenah kwatro ate" at 0434. (Helms, NY)

7606: Female speaker repeating what sounded like "victor eenah kwatro too" at 0330. (Helms, NY)

7651: Voice of America, Greenville, NC. Arabic music at 0450 (MacKenzie, CA). Technically, this is supposed to be a relay to an overseas transmitter site. However, it is a de facto broadcast! (Editor)

7870: "N" beacon, repeated continuously, around 0300. (Helms, NY)

7895: "A" beacon, repeated continuously, around 0300. (Helms, NY)

8080: Five digit English "numbers" station, woman's voice at 0315. (Helms, NY)

8118: "66N" beacon, repeated continuously, around 0320. (Helms, NY)

8479: FUF, French Navy, Fort de France, Martinique, "VVV" CW marker 0245. (Helms, NY)

8598: OXZ, Lyngby Radio, Lyngby,

Denmark, "IIIII CQ" marker at 0250. (Helms, NY)

8746.8: WOM, Miami, FL, handling phone calls from ships (the "Celeste") in USB at 0318. (MacKenzie, CA)

8932: Spanish language pop music, transmission broken up several times, around 0345. (MacKenzie, CA)

11243: "Sky King" transmissions on this SAC frequency jammed by pop music at 0332! (MacKenzie, CA)

11282: United Flight #62 in contact with Seattle control center in SSB at 0437. (MacKenzie, CA)

11533: Four digit Spanish "numbers" station using woman's voice at 0445. (MacKenzie, CA)

13159.7: LPL4, General Pacheco Radio, Buenos Aires, Argentina, voice marker in Spanish read by a man at 0500. (MacKenzie, CA)

13436: Five digit Spanish "numbers" station using woman's voice at 0533. (MacKenzie, CA)

13344: KVM70, Honolulu VOLMET, Honolulu, HI, aeronautical weather bulletin read by man at 0300. (MacKenzie, CA)

17580.5: Unidentified relay station "feeder," presumed to be in USSR, with Russian language programming in SSB at 0400. (MacKenzie, CA)

20124: Voice of America, Greenville, NC, relay station "feeder" with Arabic program in SSB at 2040. (MacKenzie, CA)

That's all for now. See you next time!

LEARNING THE MORSE CODE?

Try the All New AEA BT-1 — Basic Trainer For Morse Code



AEA, in conjunction with ETS (Educational Technology and Services)*, has developed the BT-1 Code Trainer. ETS methodology, based upon research by a prominent mid-west university, has demonstrated that a typical student using this system and the BT-1 can learn Morse code to speeds of 20 WPM in four weeks based upon two 20 minute daily training sessions.

The pre-programmed BT-1 computerized trainer will allow you to achieve proficiency in Morse code faster than any other known method.

No prior knowledge of Morse code is required to use the BT-1. There are no tapes to purchase or wear out. The BT-1 operates from a 12 VDC source or from the AEA 117 Vac wall adapter unit, AC-2. For portable use the BT-1P is available with Nicad batteries and comes with a charger that operates from 117 Vac. The unit can also be used in mobile settings via the 12 VDC system.

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

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Brings you the
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**See the BT-1 at your dealers or write:
Advanced Electronic Applications, Inc.
P.O. Box C2160
Lynnwood, Washington 98036
(206) 775-7373 Telex: 152571 AEA INTL**

NEW AND EXCITING TELEPHONE TECHNOLOGY

Cordless Telephone Range: Here Are The Facts!

You cannot add a linear amplifier to extend your new cordless telephone's range. It simply won't work. However, there are several tricks to give you the portable telephone coverage you may be looking for.

Most cordless telephones operate in the 1.7 MHz/49 MHz range. Some very expensive phones, new on the market, operate exclusively on 49 MHz. Both systems may be modified to double and sometimes triple your existing range.

1.7 MHz/49 MHz Systems

These are the most common cordless systems around. The base transponder transmits the telephone side of the conversation on one of three channels near 1.7 MHz, FM.

The cordless handset receives the base signal on a tiny loop-stick antenna built into the inside of the handset. The signal is picked up off of the AC wiring powering the base transponder. The wiring is actually the 1.7 MHz antenna.

The cordless handset transmits back to the base unit on one of five channels at 49 MHz, FM. The telescopic or rubber antenna on the handset transmits the 49 MHz signal.

On the base transponder, the telescopic antenna picks up the 49 MHz signal. We now have a complete circuit with simultaneous talk and listen capability.

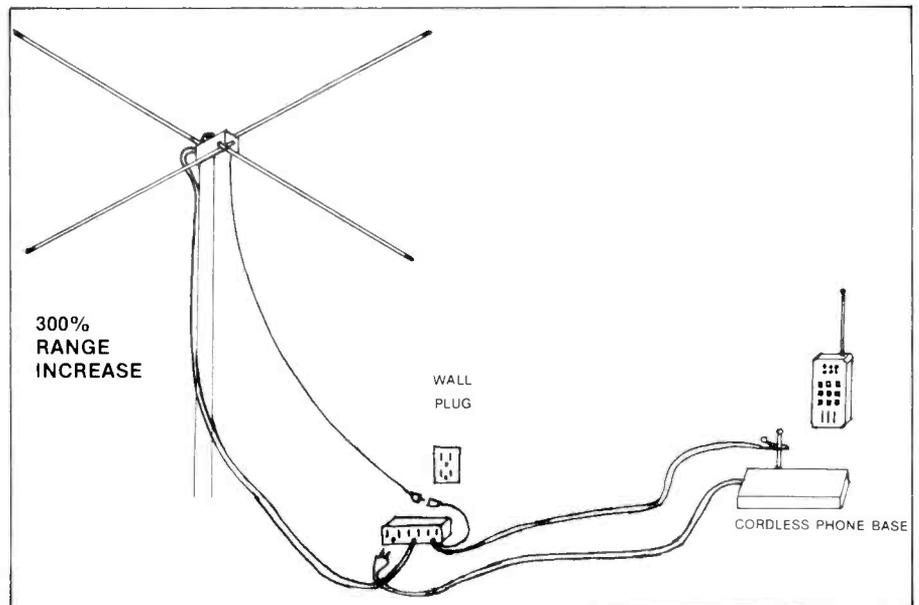
The power output levels of the base and handset unit are under 100 milliwatts. This is less than 1/10 of a watt. This low power level is also the same as toy walkie-talkies operating on the same exact frequencies as the cordless handset.

Most manufacturers guarantee at least 600 feet range from transponder to the portable handset. The range is quite dependent on the location of the transponder and hook-up technique. This is what we will explore in order to accomplish modification of a system for greater range.

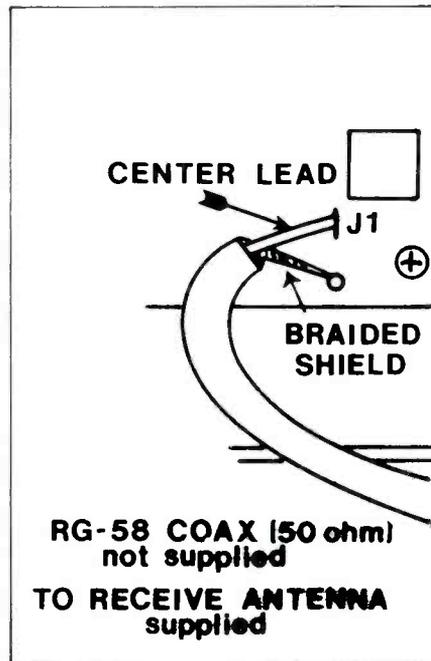
Range Limitations

Since we are only dealing with a power output of less than 100 milliwatts, don't expect a range, after modification, of greater than a half mile. At this power level and frequency range, 1500 feet may be the top limit. For most of you, this will be "super range" compared to the 400 to 600 foot range you now enjoy.

Let's focus our attention on the base and handset antennas. This is where additional range may be hooked up. We will keep this only a theoretical discussion so as not to violate FCC rules that may prohibit modification of cordless telephone antennas for



An outside antenna kit will greatly extend the range of most cordless phone systems.



Replace the base whip with an outside antenna connected via RG/58 coaxial cable.

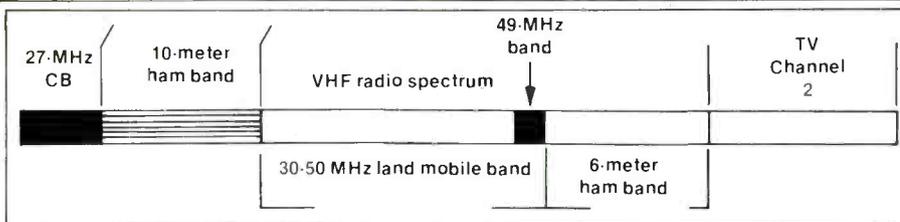
greater range. Manufacturers of cordless telephones are quick to point out that antenna modifications may be illegal. Cordless telephone accessory manufacturers who sell antenna extension kits claim otherwise. They feel that there is no rule violation in extending the length of an antenna for cordless operation.

On the handsets, the telescopic metal antenna is best for maximum range. Going to a rubber antenna will only decrease your ultimate range. Most telescopic antennas are tuned and pruned for maximum signal transmission at 49 MHz. There is little you can do to extend your cordless handset transmit-to-base range.

It's the same thing with the cordless handset loop-stick antenna. This antenna is as large as it may be to fit inside the handset. It has the arduous job of picking up the weak 1.7 MHz signals. Generally, the loop-stick antenna has less capabilities of hearing signals at 1.7 MHz as compared to the transmit capabilities of the telescopic antenna at 49 MHz. In plain English, you can talk back further than you can listen on the handset.

Modifying the base transponder antenna is the secret to success for extended range. You may increase the reception range on the base transponder by installing a well-elevated outdoor 49 MHz antenna. These antennas are commercially available and come complete with coaxial cable kits. The only hard part is attaching the coaxial cable to the base transponder. It's best to remove the base transponder telescopic whip, and soldering the coaxial cable center conductor to where the whip was originally attached to the PC board. The coaxial cable braid goes to the circuit board's ground connection as close to the antenna connecting point as possible. Your base transponder is now listening from a rooftop antenna up high.

Since the base transponder transmits the telephone side of the message at 1.7 MHz



The 49 MHz CB hand-held cordless phone band is located just above the 30-50 MHz highway patrol band.

into your AC housed wiring, great caution must be taken when dealing with this type of antenna circuit. First of all, you don't want to make any modifications that might burn up your unit or roast your home.

A well-elevated extension cord between your base transponder and your wall plug may greatly enhance transmit range. If your home is wired with grounded conduits, the signal has little chance to escape from within the conduit, and won't be received at any great distance by the portable handset. The elevated extension cord helps get the signal in the air for greater transmit range.

Commercial "range extenders" for the AC side of the wiring are available that help transfer the energy from your base transponder into the household wiring. The system works fine on paper, but range is very dependent on what type of wiring you have.

Range also is dependent on whether or not your wiring is common with other AC wires that run down the block. Signal levels are quickly dissipated by transformers and power meters in the AC circuit. You may wish to plug your base transponder into different AC outlets to find one on a different circuit that may yield greater range where you plan to operate.

I once found a case where the cordless phone system was in a high-rise office building and worked poorly in one of the offices. We plugged it into a separate AC power source in another office, and now our office worker enjoys cordless telephone range throughout the 18 story building! Other than changing the location of the transponder, no other modifications were made.

Remember, the hardest part of extending the range of any cordless set is the 1.7 MHz transmit side from the transponder unit. Keep this in mind during your modification attempts.

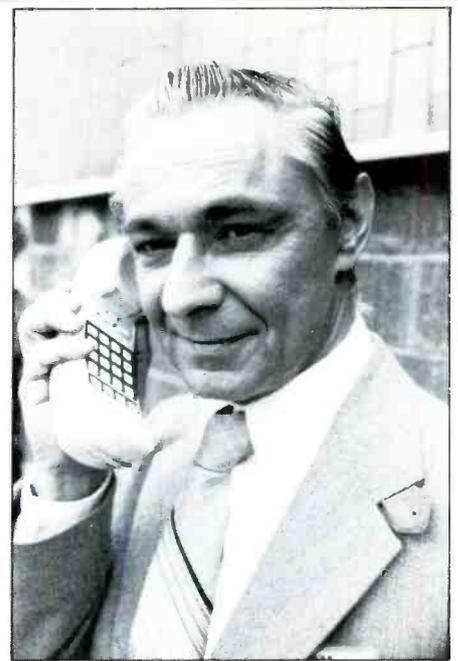
49 MHz/49 MHz Systems

Cordless telephones that operate entirely within the 49 MHz frequency band are more expensive. However, their range is easily enhanced using base antenna modification concepts.

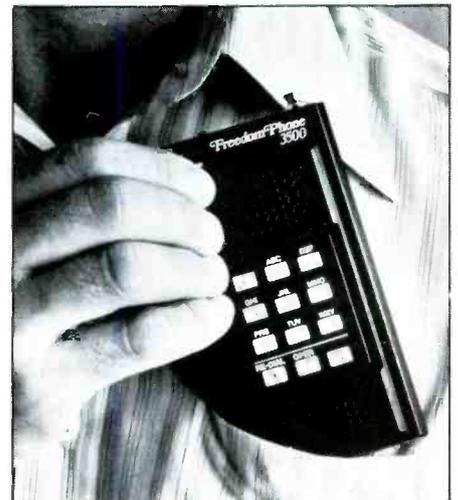
There is little that may be done to the cordless handset antenna. The telescopic antenna supplied with the unit is about as long as manageable around a house or office. It's also unwise to make changes in this antenna because you may upset the built-in 49 MHz duplexer. Remember, the handset is transmitting and receiving on frequencies separated by only 15 kHz.

The base unit may be disassembled carefully, removing the single lead-in wire to the external telescopic antenna. Back track from this wire and find its origin on the circuit board at the opposite end of the PCB. Disconnect this transition wire and solder the center lead of 50 or 75 ohm coaxial cable to the PCB antenna point. Now solder the braid of the coaxial cable to a close ground foil source. Carefully reassemble the unit, manipulating the coaxial cable so it exits at a convenient spot.

Run the cable up to the roof and terminate into a PL-259. Now go out and buy a 49 MHz antenna and connect the coax to this outside antenna.



A cordless phone will save time and energy.



Small enough to fit into a pocket, the cordless phone will give you good range.



For maximum range choose a 49/49 MHz system. Electra Co. is first with this system.



Full duplex on 49/49 MHz.

Bearcat® 210XL Super Scanner

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.

"TAKE IT FROM A SMART OPERATOR."

Don Adams

**BEARCAT 210XL
SCANNER
\$229.**



THE LOWEST PRICED, FULL-FEATURE, BEARCAT NO-CRYSTAL SCANNER EVER.

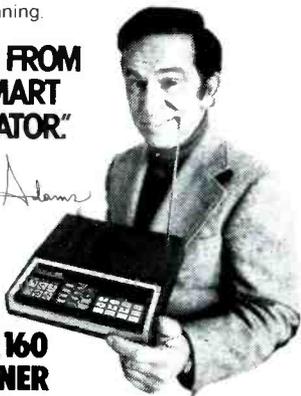
Bring home all the real excitement of scanning, and save! Bearcat 160 features a smooth, keyless keyboard for all controls including volume and squelch. Has 5-band, 16 channel coverage. Priority, Selective Scan Delay, Automatic Lockout and Search. And much more. Bearcat is number one in scanning.

"TAKE IT FROM A SMART OPERATOR."

Don Adams

**\$189.
BEARCAT 160
SCANNER**

Electra Electra Company
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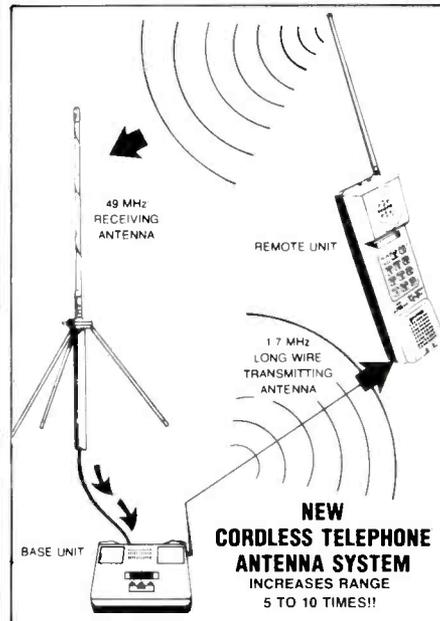
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CIRCLE 66 ON READER SERVICE CARD



Here is the new Pathcom cordless set.

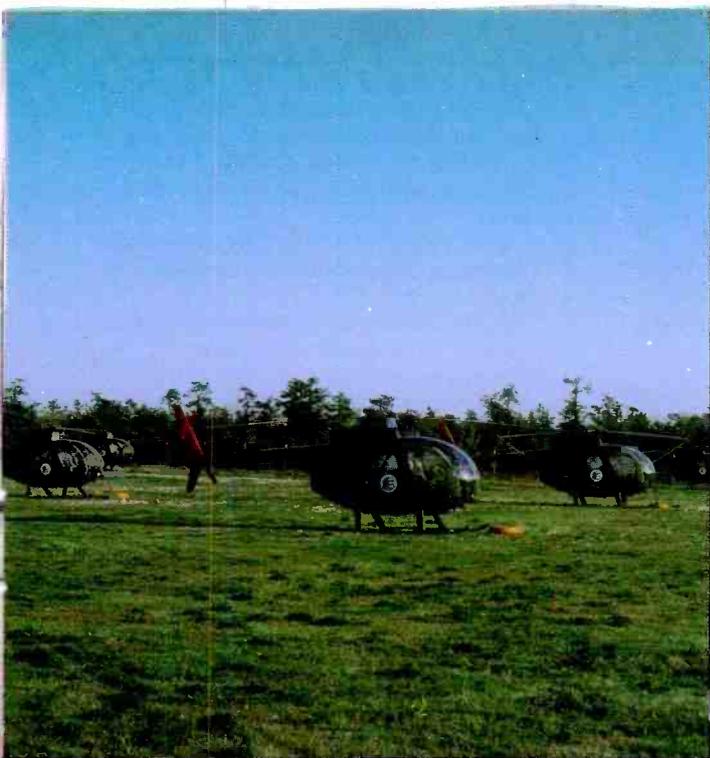


You will now find that you have probably doubled your range. Since most 49/49 MHz systems emit a low power constant carrier, even when the unit is not in use, it's easy to check your range with a scanner or tunable receiver that will listen down to 49 MHz.

Conclusions

It's relatively easy to modify the transponder antenna systems for an increase of range to your cordless handset. You are urged to make all antenna modifications carefully. Any soldering inside the base unit may void the manufacturer's warranty. We also advise that these modifications may or may not exceed the FCC's rulings on the maximum radiated power for a Part 15 device.

Enjoy your cordless telephone, and the extra range you have now achieved.!



The flight line is guarded by security patrols.

A POP'COMM Intelligence Report

Scanning The: Air Force Security Police

Anybody within monitoring range of an Air Force installation has missed a lot if they haven't fired up the ol' scanner on the control tower or ground control frequencies used at that base; likewise the frequencies used for weather, arrival and departure, and pilot-to-dispatcher. Of course, you need a scanner with the VHF aero band to hear this and military bases generally call for a receiving ability for the UHF aero band. (Unfortunately, no company produces a scanner for this exciting 225 to 400 MHz band.)

Military installations of all of the services also bristle with communications located on frequencies within the coverage range of standard public safety scanners. One of the more interesting things to be monitored along these lines is the Air Force Security Police, which is functional not just at the larger Air Force bases, but may be operational at smaller installations that don't even have facilities for aircraft.

Actually, there are several different categories of Air Force Security Police. One type consists of (and is known as) "Law Enforcement" (LE) officers. These are the people who are seen guarding the gates at Air Force installations; they also patrol base housing areas. In fact, they patrol many areas of the base. Their uniform is the familiar Air Force blue shirt and trousers; they pack .38 side-arms and sometimes 12 gauge riot guns.

Another category is called "Security," and these personnel wear camies or fatigues, carry M-203 or M-16 type weapons (sometimes M-60s). They handle security at the restricted areas of the flightline.

The "K-9" personnel may be attached to LE or Security details and can be recognized by their fatigues or blue uniforms. Yet another division is known as "Missile Security,"

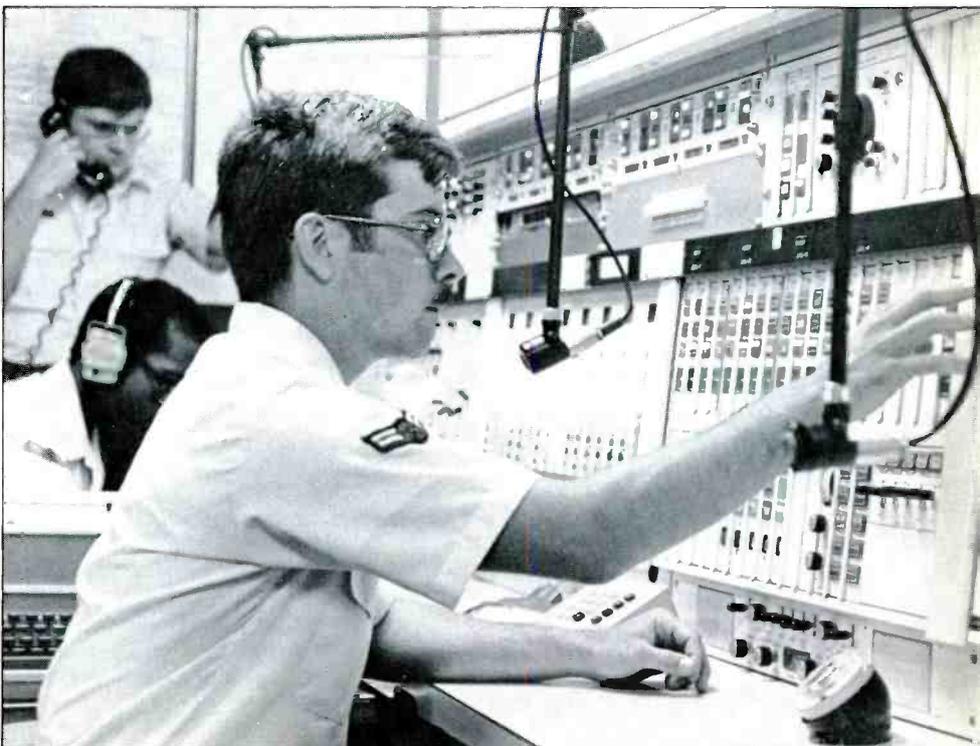
and these are the patrols found at bases where missiles are located. They are armed with M-16 rifles and uniformed in fatigues.

These various security endeavors probably operate on separate frequencies at Air Force installations where they coexist, although they could have common channels for communicating with one another when necessary. Their communications codes and code-words are uniform between units at all installations.

The frequencies used at various USAF in-

stallations by security forces are thought to be drawn from the following channels:

149.175 MHz	173.4375
149.205	173.5125
163.1875	173.5625
163.4625	173.5725
163.4875	173.5875
163.5125	173.6375
163.5375	173.6625
163.5625	173.6875
165.1125	173.7125
165.1275	173.7875



It should be pointed out that some of these frequencies may be assigned for fire department and other non-enforcement purposes at installations where they are not required for enforcement operations. These frequencies are also in use at many Army bases.

Some USAF Security Forces 10-Codes

- 10-1 Receiving poorly
- 10-2 Receiving well
- 10-3 Stop transmitting
- 10-4 Acknowledge, will comply
- 10-5 Stand by
- 10-6 Station clear
- 10-7 Out of service at _____
- 10-8 In service at _____
- 10-8X In service with female suspect or victim at (location)
- 10-9 What is your location?
- 10-10 Return to normal post
- 10-11 Return to this station
- 10-12 Phone this station
- 10-14 Latrine break at _____
- 10-15 Non-hostile emergency at _____
- 10-19 Disregard prior transmission
- 10-20 Repeat message
- 10-21 Radio check
- 10-22 Security check
- 10-23 Time check
- 10-24 Weather/road check
- 10-25 Proceed to _____
- 10-26 Enroute _____



- 10-27 What is your ETA?
- 10-28 Arrived at scene
- 10-29 Last assignment completed
- 10-30 Convoy or escort
- 10-31 Alarm sounding at _____
- 10-32 Stopping/investigating motor vehicle
- 10-33 Crime in progress at _____
- 10-34 Negative

Code Words & Terminology

AUGMENTATION RESERVE FORCE. Military personnel who, while not actually security forces, are trained and capable of assisting base security forces as needed. (Slang—"Augies Doggies")

BACK-UP ALERT FORCE. A small armed security force that can respond to any point on the base within a few minutes.

"BUSY SENTRY HOTEL." Inspection initiated.

CENTRAL SECURITY CONTROL. The CSC is the normal (or emergency) operational command post on a base from which USAF security operations are conducted.

CLOSE BOUNDARY SECURITY. Measures taken to maintain the boundary of an area under security surveillance.

"CODE 1." Code word indicating lights and siren not authorized; routine.

"CODE 2." URGENT, lights authorized but no siren.

"CODE 3." EMERGENCY, lights and siren authorized.

"COMMAND 1." ID of the Chief of Security Police (Squadron Commander) on any base.

"COMMAND 2." The coded ID "Command" followed by 2 or a higher number ID's; any officer who is also a member of the security force.

CONTROLLED AREA. A land or water

area, building, structure, or room to which entry must be controlled to protect USAF physical resources contained in the area.

ENTRY CONTROL POINT. The ECP is the point where personnel enter restricted areas.

ENTRY CONTROLS. This applies to the admission of personnel into established restricted areas.

EXCEPTION. A condition where existing facilities, equipment, manpower, or procedure (even though not in accordance with security directives) provide security equal to or better than the directives require and permanent retention of the condition is desired.

HOSTILE ACTION. Activities sponsored or conducted by one nation against another nation, using any means.

FIXED RADIO. A radio transceiver permanently installed in or used at a fixed location or base station.

MASTER SURVEILLANCE & CONTROL FACILITY (MSCF). An elevated observation facility that is the focal point for control of the internal/external intrusion detection equipment installed within a restricted area and for communications with (and control of) security operations in that area.

NO LONE ZONE. Designated zones containing critical components where the presence of a lone individual is prohibited.

"POLICE 1." The coded ID of the highest ranking enlisted Law Enforcement flight chief.

"POLICE 2." The coded ID of a Law Enforcement vehicle patrol; may have any numeral of 2 or higher.

PREVENTIVE PERIMETER. An outer perimeter formed during emergency security operations by stationing security forces at key vantage points and avenues to the vital portions of a base.

"RED 1." Coded ID of the area supervisor in a particular classified area.

"RED 2." Code word denoting the entry control point.

"RED 3." Code word denoting the Security Alert Team.

RESERVE FORCE (RF). An armed force that can respond to any point on the base within 30 minutes.

RESTRICTED AREA. An established military zone under USAF jurisdiction into which persons may not enter without specific authorization. Areas that contain operational resources.

"SAFE WIND." Code word denoting a down-channel report from a command or HQ ordering emergency operations.

"SECURITY 1." Code ID for on-duty Security Flight Chief (highest ranking enlisted).

"SECURITY 1 ALFA." Code ID for the Assistant Flight Chief for Security.

SECURITY ALERT TEAM. Two or more security force members who form the initial reinforcing element responding to security alarms, emergencies, or irregularities.

TWO-MAN CONCEPT. Any two authorized security personnel. Their selection depends upon the task to be performed and the capability of each to detect departures from authorized procedures.

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CIRCLE 37 ON READER SERVICE CARD

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SSB, CW, AM, FM, digital VFO's, 10 memories, memory and band scan, dual 24-hour clocks...

R-2000

The R-2000 is an all mode SSB, CW, AM, FM receiver that covers 150 kHz–30 MHz in 30 bands. New microprocessor controlled operating features and an UP conversion PLL circuit provide maximum flexibility and ease of operation to enhance the excitement of listening to stations around the world. Key features include digital VFO's, ten memories that store frequency, band, and mode information, memory scan, programmable band scan, fluorescent tube digital display, and dual 24-hour clock with timer.

R-2000 FEATURES:

- **Covers 150 kHz–30 MHz in 30 bands.**
Uses innovative UP-conversion digitally controlled PLL circuit. UP/DOWN band switches (1-MHz step). VFO's continuously tuneable across 150 kHz–30 MHz.
- **All mode: USB, LSB, CW, AM, FM.**
Provides expanded flexibility in receiving various signal types. Front panel mode selector keys, with LED indicators.
- **Digital VFO's for best stability.**
50-Hz step, switchable to 500-Hz or 5-kHz, using front panel pushbutton switches. F. LOCK switch provided.
- **Ten memories store frequency, band, and mode data.**
Complete information on frequency, band, and mode is stored in memory, assuring maximum ease of operation. Each memory may be tuned as a VFO. Original memory frequency may be recalled. AUTO. M switch for automatic storage of current operating data, or, when off, selective storage of data using M. IN switch.
- **Lithium battery memory back-up.** (Est. 5 yr. life.)
- **Memory scan.**
Scans all memories, or may be programmed to scan specific memories. HOLD switch interrupts scanning. Frequency, band, and mode are automatically selected in accordance with the memory channel being scanned. The scanning time is approximately 2 seconds per channel.
- **Programmable band scan.**
Scans automatically within the programmed bandwidth. Memory channels 9 and 0 establish upper and lower scan limits. HOLD switch interrupts scanning. Frequency may be adjusted, using the tuning control, during scan HOLD.
- **Fluorescent tube digital display (100-Hz resolution).**
Built-in 7 digit fluorescent tube digital display indicates frequency or time, plus memory channel number. DIM switch provided. The display may be switched to indicate CLOCK-2, FREQUENCY, CLOCK-1, and timer ON or OFF by the front panel FUNCTION switch.
- **Dual 24-hour quartz clocks, with timer.**
Permits programming two different time zones. Timer for ON and OFF programming. Timer REMOTE output on rear panel (not for AC power).
- **Three built-in IF filters with NARROW/WIDE selector switch.** (CW filter optional.)
6 kHz wide or 2.7 kHz narrow on AM. 2.7 kHz automatic on SSB. 2.7 kHz wide on CW, or, with optional YG-455C filter installed, 500 Hz narrow. 15 kHz automatic on FM.
- **Squelch circuit, all mode, built-in, with BUSY indicator.**
- **Noise blanker built-in.**
Eliminates pulse-type noise on SSB, CW, and AM.
- **Large front mounted speaker.**
- **Tone control.**
- **RF step attenuator. (0-10-20-30 dB.)**
Four step attenuator, plus antenna fuse.
- **AGC switch. (Slow-Fast.)**
- **"S" meter, with SINPO "S" scale.**
- **High and low impedance antenna terminals.**
A high impedance (500 ohm) terminal, and a low impedance (50 ohm) co-axial connector are provided.
- **100/120/220/240 VAC, or 13.8 VDC operation.** (Optional DCK-1 cable kit required for 13.8 VDC.)
- **Other features.**
 - RECORD output jack.
 - Audible "beeper" (through speaker).
 - Carrying handle.
 - Headphone jack.
 - External speaker jack.
- **Optional accessories:**
 - HS-4, HS-5, HS-6 headphones.
 - DCK-1 DC cable kit.
 - YG-455C 500-Hz CW filter.
 - HC-10 World digital quartz clock.

More information on the R-2000 is available from all authorized dealers of Trio-Kenwood Communications
1111 West Walnut Street
Compton, California 90220.

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CIRCLE 152 ON READER SERVICE CARD

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LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

Shortwave listening can be a lonely hobby. Most of the time it's just you and your radio. Joining a major DX club and developing some correspondence with people who share your special shortwave interests is a great way to develop friends in the hobby. But they can still be located some distance from you.

The major DX clubs are complimented by a number of local or regional clubs scattered around the country; some even publish their own bulletins, or at least hold regular meetings that may often be within easy driving distance. Such groups are an excellent way to beat the loner feeling. The major DX club bulletins often carry news of these groups and/or their meeting dates.

In a future column, we plan a rundown on these local and regional groups. If you know of one, perhaps even operate one, we'd like the particulars.

In the meantime, try seeking out a group in your area. We urge you to get involved since local clubs can lead you to an increased knowledge about the hobby and can be the source of lasting friendships. Who knows? You might discover there's a DXer you didn't know about just down the block!

The Case of the Complaining Clandestine

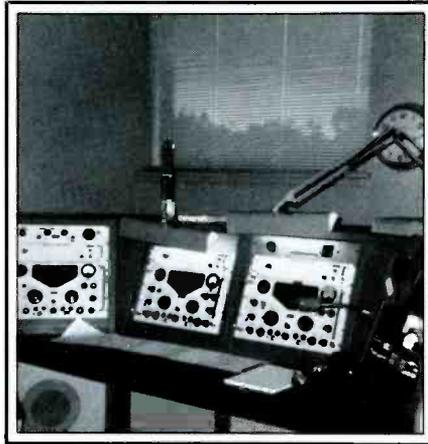
Staffers at the anti-El Salvadoran clandestine Radio Venceremos have a gripe. They claim their broadcasts are being interfered with, and, yes, you can read "interfered" as "jammed", by none other than the United States military!

Last summer, DXers who had sent reception reports to the station began receiving "white papers" from the station complaining about being jammed by emissions from the USS Destroyer "Caron" anchored in the Gulf of Fonseca. The Gulf outlets to the Pacific Ocean and washes the borders of El Salvador, Honduras, and Nicaragua.

According to Radio Venceremos, the Caron was creating a loud hum or buzz whenever Radio Venceremos came on the air. Occasionally, music was played over the Radio Venceremos broadcast rather than the buzz or hum, according to the clandestine station's complaint.

Radio Venceremos appealed to its listeners to do what they could to help get rid of what it felt was intentional jamming. Some DXers later received sixty minute cassette recordings from the station that had recorded examples of various types of interference said to have come from the U.S. ship.

Earlier, news reports noted that electronic intelligence gathering ships of the U.S. Navy had located Radio Venceremos' transmitter



How would you like to have this shack? It belongs to the Canadian Broadcasting Corporation's monitoring service in Ottawa. Shown in this photo are three high power Racal receivers.

in Nicaragua rather than in Morazan Province of El Salvador where the station claims it's located. Several other clandestine radio transmitters were said to have been in Nicaragua, too. One could speculate that Radio Farabundo Marti, another anti-El Salvador operation, may be one of those mentioned.

Radio Venceremos, the Voice of the Farabundo Marti National Liberation Front for El Salvador, began operations on shortwave on January 10, 1981, and says it is located in the Francisco Sanchez Western Front in El Salvador. The station operates on 6.950 megahertz (somewhat variable) at 1200, 1300, 0000, 0100, 0230, and 0330 GMT and on Sundays at 1400, 2000, and 0230 GMT.

For a clandestine station it has been surprisingly widely verified by DXers. Reports can be sent to Apartado 7-807, Mexico City, or to Apartado Postal 2363 Telcor, Los Escombros, Managua, Nicaragua.

Your DX Library

Although this column is devoted to shortwave broadcast listening, the SWBC listener and DXer often runs into mysterious signals he'd like to know more about. Here's the answer—*The SWL's Manual of Non-Broadcast Stations* by Harry L. Helms, \$12.95 from Tab Books, Blue Ridge Summit, Pennsylvania, 17214.

From "utility" type stations, including air-ports, ships, point-to-point, and so on, to a discussion of the various modes of transmissions and propagation, marine communications, spy stations, time stations, receiving equipment, and QSLing, there's little left untouched. It's a good one to have on your

reference shelf next time you hear a station you can't get a handle on.

Here's What's On

Remember that all times/dates are Greenwich Mean Time.

Afghanistan You can try following what the Russians are up to by checking for Radio Afghanistan. No transmissions are aimed at this continent, but they're scheduled in English to Europe from 1900 to 1930 GMT on 9.665, 11.960, and 15.077 MHz. Some of Radio Afghanistan's transmitters are actually in the USSR.

Angola Radio Nacional de Angola was noted on 9.535 at 0425 in Portuguese with lots of African music. (Hotaling/ASWLC)

Argentina Radiodifusion Al Exterior from Buenos Aires in English at these times: 0100 to 0130, 0230 to 0300, 1100 to 1130, 1530 to 1600, 1630 to 1700, 1730 to 1800, 1930 to 2000, and 2230 to 2300 on 6.060, 6.180, 9.690, 11.710, and 15.345. (R. Lucas, SPEEDX) 6.180 is said to be carrying a new, high power transmitter. (ed)

Belize Radio Belize uses 3.285 and can occasionally be heard in the early morning, pre-sunrise hours, or on local evenings in English.

Botswana Radio Gaberones was heard on 3.356 at 0418 in parallel with 4.845. This one is not too easy to hear and is nearly impossible to verify. (Cohen, ASWLC)

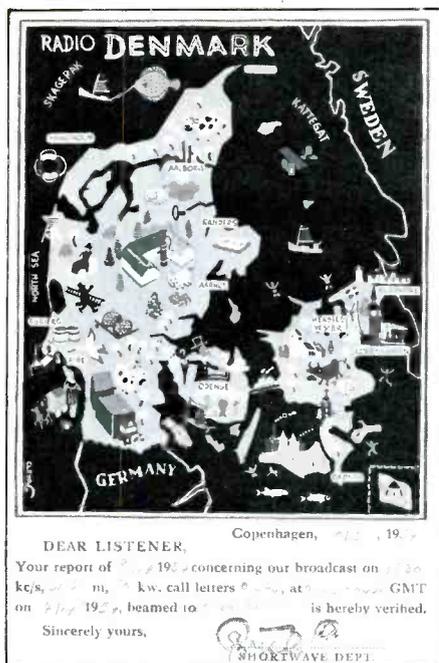
Cameroon Look for Radio Cameroon from its outlet at Bertoua on 4.750 in French around 0450. News in French is at 0500. (Klein, NASWA)

Chile Try Radio Agricultura from Santiago on 9.630 around 2345 with popular Latin American music. Programs are all in Spanish. (Valko, Helsems, NASWA) An interesting but rather difficult catch is Radio Patagonia Chilena on 6.080, scheduled for a 1030 GMT sign on with identification in both Spanish and English. It's located at Coyhaique. Sign on time on Sundays is later and varies widely. (Ron Howard, *Listener's Notebook*, NASWA)

Clandestine The Voice of Free Africa can be heard in vernaculars at 0400 over Radio Television Congolaise on 4.765. No known verifications from this one yet.

Colombia Radio Sutatenza is a regular from Bogota on 5.095 in the early mornings and local evenings. (NASWA reporters)

Congo From Brazzaville, La Voix de la Revolution Congolaise is on in French and local languages from 0400 to 0700 on 3.232, 3.264, and 4.765, from 0700 to 1700 on 6.115, 7.105, 7.175, 9.610, 9.715, from 1700 to 2100 on 3.232, 3.264, and 4.765, and also from 1100 to 2300 on 15.190. (Flanagan, SPEEDX)



Radio Denmark should be on with a new 500 kilowatt transmitter by the time you read this. This Radio Denmark QSL dates back to 1959.

Denmark Radio Denmark is scheduled to North America from 0000 to 0055 on 15.165, 1300 to 1355 on 17.770, 1900 to 1955 on 15.165, and from 2100 to 2155 on 15.165. Each broadcast begins with an English announcement, but the programs are in Danish. This station should be on with its new 500 kilowatt transmitter by now. (Flanagan, SPEEDX)

Ecuador Some interesting lower band Ecuadorians being heard include 3.260 La Voz de Rio Carrizal; 3.280 La Voz del Napo; 3.285 La Voz del Rio Tarqui; 3.381 Radio Iris; 3.395 Radio Zaracay; 4.655 Cadena Radiodifusora Ecuatoriana; 4.680 Radio Nacional Espejo; 4.795 La Voz de los Caras; 4.800 Radio Popular; 4.820 Radio Paz y Bien; 4.851 Radio Luz y Vida; 4.911 Emisora Gran Colombia; 4.960 Radio Federacion; 4.990 Radio Bahai; 5.025 Radio Splendit; 5.050 Radio Jesus del Gran Poder. Try in local evenings or mornings between 0900 and 1100. (NASWA reporters)

Equatorial Guinea Try Radio Malabo on 6.250 around 0500 with African music.

Finland Radio Finland to North America is scheduled at 1100 to 1130, 1200 to 1230, and 1330 to 1400 on 15.400 and 17.800. The 1200 transmission runs until 1400 on Sundays. (Hesch, SPEEDX)

French Guiana 3.385 France Region Trois from Cayenne in French around 0330. Sign off is around 0105. (Meyer, Alexander, NASWA) You might log this one with greater strength on 5.055. (ed)

Greece The Voice of Greece has been noted at 0340 on 15.595 with English and Greek up to 0350 sign off. (Frodge, ASWLC)

Grenada Radio Free Grenada on

15.045 makes for fascinating listening. Try around 2130 GMT weekdays. You'll hear everything from BBC relays to reggae music to obituaries. (NASWA reporters)

Hungary Radio Budapest broadcasts to North America from 0100 to 0130 except Mondays on 6.025, 9.585, 9.835, 11.910, 15.220, and 17.710, and from 0200 to 0230 on 6.025, 9.585, 9.835, 11.910, 15.220, and 17.710. Also, on Wednesdays and Saturdays it is heard from 0300 to 0314 on the above frequencies. (Chinsky, Hesch, Krist, SPEEDX)

Japan Radio Japan is looking into the use of single sideband transmissions and was scheduled to experiment with this method in transmissions to the West Coast of North America. If you log these broadcasts, reports to Radio Japan would no doubt be very welcome by the station. (Bob Bodel, *Listener's Notebook*/NASWA)

Kenya Always a rather difficult country to hear, Kenya may now be using their 250 kilowatt transmitter. Frequencies to check are 4.885, 4.904, and 4.934. (SCDX)

Laos Radio Nacional Lao has reactivated its English service from 1330 to 1400 using a variable frequency around 7.030. (Goonetilleke, via Radio Nederland Media Network, via *Listener's Notebook*/NASWA)

Lesotho Look for Maseru's Radio Lesotho on 4.800 around 0500 with local music and commercials. This is a bad channel for utility stations, so you can expect QRM much of the time. (Billier, NASWA)

Liberia The Liberian Broadcasting System, silent for two years due to equipment problems and the last government overthrow, has returned to shortwave; check 6.090 from 0800 to 1730 and 3.255 from 0530 to 0900 and 1600 to 2400. (Choroszy, *Listener's Notebook*/NASWA)

Libya Radio Jamahiriya will provide you with some interesting listening from 2200 to 2300 in English on 11.815. (Stephany, SPEEDX)

Mongolia Radio Ulan Bator has been logged on 12.070 from around 1150 in Chinese, going into an English program at 1200. (Hosmer, Jordon, NASWA)

Mozambique Radio Mozambique was heard on 3.210 from 0415 with an English identification. (Klein, NASWA)

Namibia Radio Southwest Africa uses 4.965 from 0300 to 0615 and 1515 to 2200, and 9.650 from 0615 to 1515. The other frequency, 3.270, is in use from 0300 to 0515 and from 1615 to 2200; 7.190 is in use from 0515 to 1615. (Ginbey, SCDX)

North Korea Radio Pyongyang is transmitting to the Americas from 1100 to 1300 GMT on 9.745 and 9.977 and also from 2300 to 0000 on 9.745 and 15.230. (Radtko, SPEEDX)

Sweden Radio Sweden to North America is on from 0230 to 0300 on 11.705 and 15.420, from 1400 to 1430 on 17.790 and 21.700, and from 2300 to 2330 on 11.705 and 15.380. (Rady, Arrington, MacKenzie, ASWLC)

Somalia Formerly a pretty rare logging, Radio Mogadishu is now being widely



Radio Netherland's "Happy Station" host, Tom Meyer (right), receives the key to the city of Huntington Beach, California from POP'COMM reporter Stewart MacKenzie.

heard. Try 6.790 from around 0300. Native chants make up these programs and there's some interference from utility outlets.

Tahiti Radio Tahiti in Papeete is on the air in French and Tahitian from 1600 to 0730 on 6.135, 11.825, and 15.170. On Saturdays, the broadcast runs until 0900. (Evans, SPEEDX)

Transkei Capital Radio in this South African Homeland is on 3.930 and is heard around 0400. Commercial programming and popular music. (Petrick, NASWA)

Vietnam The Voice of Vietnam was noted on 10.060 around 1100 in Vietnamese with local music and talks and possible identification in Vietnamese at 1131. (Jordan, NASWA)

West Germany Deutsche Welle, the Voice of Germany, beams to Eastern North America from 0100 to 0150 on 6.040, 6.085, 6.145, 9.545, 9.565, 9.590, 11.865, and 15.105. It beams to Western North America, from 0500 to 0550 on 5.960, 9.545, 9.650, 9.690, 11.705, and 11.905. (Clayong, Taylor, SPEEDX)

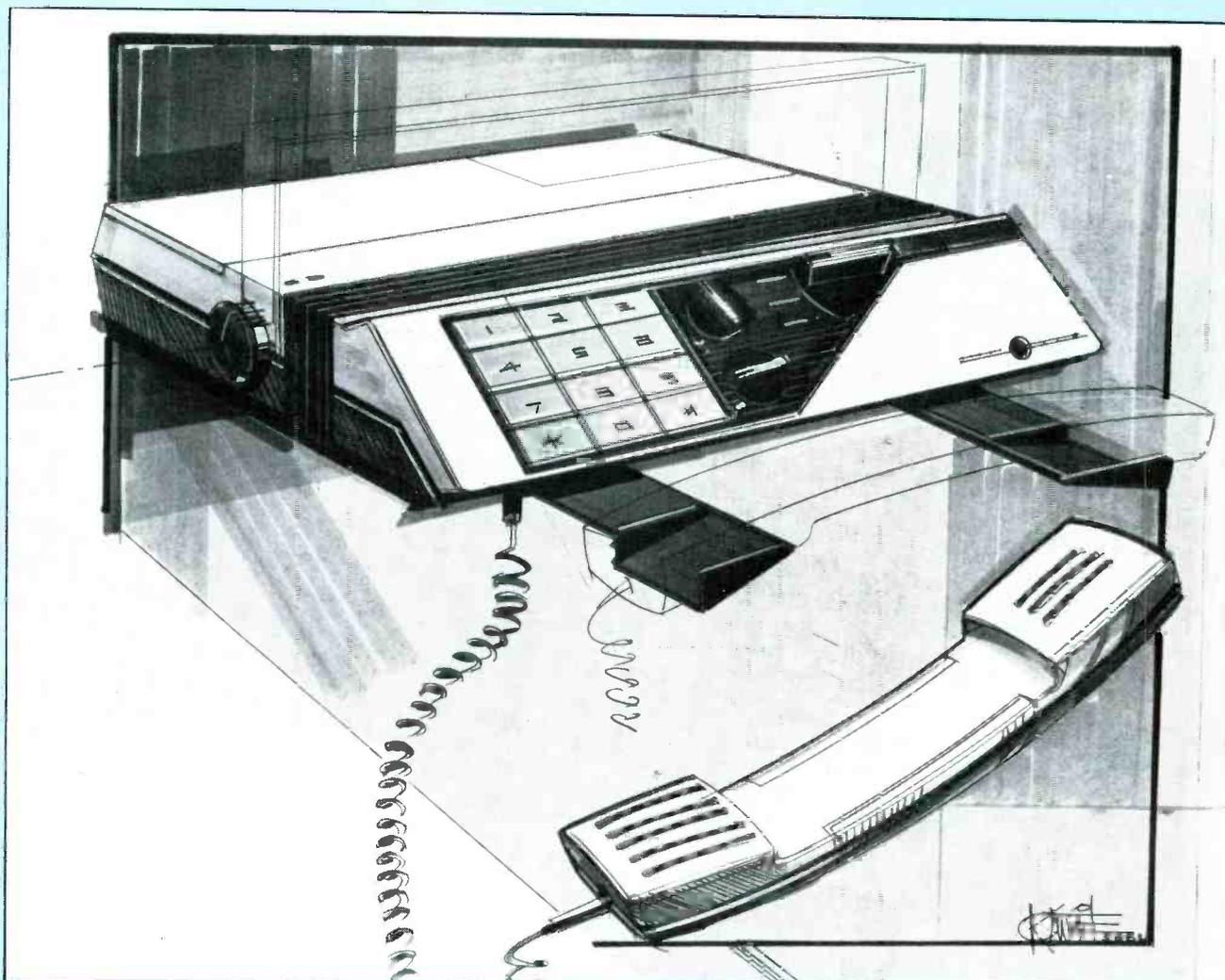
With thanks to: ASWLC-The American Shortwave Listener's Club, SPEEDX, NASWA-North American Shortwave Association, SCDX-Sweden Calling DXers Bulletin.

We're Hungry!

And we're looking for food for this column from you! How about sending us a photo of you in your shack with a description of the equipment you're using. We're also interested in clear, good contrast copies of your more interesting QSLs, your opinions, your questions, and your loggings. We'll include as many of them as possible, so let us hear from you.

Remember that shortwave broadcasts switch around constantly and that, due to schedule changes or propagation differences from day to day or season to season, we are unable to guarantee the accuracy of schedules and reports given here. But, if shortwave didn't change all the time, it wouldn't be nearly as much fun!

Hope to see you again next month!



Here's how GE's designers feel the mobile unit for PRCS will look.

GE Seeks FCC Approval For

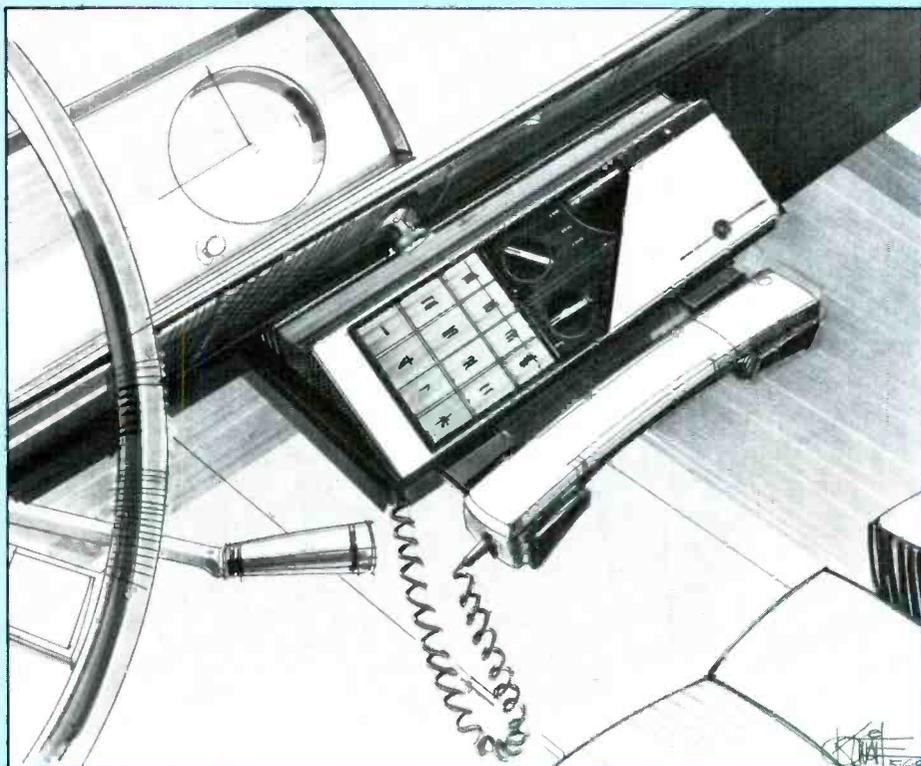
New Consumer Communications Service



The Audio Electronics Products Department of General Electric Company announced that it requested Federal Communications Commission approval for an allocation of a portion of the 900 MHz frequency band for a new consumer-oriented mobile communications service. GE's proposed new service, called the Personal Radio Communications Service (PRCS), will be specifically designed to augment limited

communications capabilities already available to consumers for road to home service. It will provide the consumer an affordable, quality service for private communications within a consumer's normal driving area.

"Our independent research clearly shows that people frequently need to communicate while on the road; too often that need goes unmet," said John M. Trani, general manager of GE's Audio Electronics Prod-



Mounted under the dashboard, the PRCS mobile transceiver will be small and unobtrusive. A telephone type handset will offer more convenience than a mic.

stations. The repeater stations may be licensed to anyone meeting minimal licensing requirements and will provide service to thousands of PRCS users. Consumers would incur a nominal monthly or quarterly subscription charge to access the repeater. The repeater stations won't be interconnected.

The PRCS system also offers a communication feature not generally available to the consumer—automatic interconnection to the public telephone network through the base station. This will allow mobile consumers, within the range of the system, to access any telephone available over the current public switched networks.

GE's application to the FCC proposes that a total of 9 MHz be set aside for PRCS, divided into two 4.5 MHz bands separated by 45 MHz. This would provide 150 channels of 30 kHz each, only increasing the allocation of the frequency spectrum for consumers' use to less than two percent.

"We have carefully examined a wide variety of alternatives and trade-offs in suggesting this frequency allocation to the commission," Trani commented. "Considering the general public's need for affordable, private, and reliable communications, we believe that an allocation of 9 MHz is necessary to provide 150 channels," he added.

POP'COMM will try to keep readers informed on this proposed new radio service!

ucts Department. "PRCS would be an important step toward meeting the mass market demand for quality, affordable private mobile communication, augmenting CB, general mobile radio services, and future cellular mobile telephone systems," Trani said. "Based on our research and preliminary design work, we believe the PRCS equipment can be made available to the general public by competitive manufacturers at prices that will be attractive for the general consumer market, provided that sufficient spectrum is set aside to permit development of a mass market," Trani stated.

The PRCS system proposed by GE will consist of a "base" station tied into the user's telephone and a "mobile" unit installed by consumers in their motor vehicles. Operating in the 900 MHz frequency band, the system will provide each user access to 150 radio channels. Each PRCS unit will have a unique identification number for security and privacy.

The expected range of the base station with roof or window-mounted antenna communicating with a mobile station would be less than five miles. That range, however, can be extended to approximately 15 miles by the use of strategically located repeater



The PRCS base station will be interconnected to the telephone lines and will give the motorist a chance to place calls directly through his own facilities.

INSIDE THE WORLD OF TVRO EARTH STATIONS

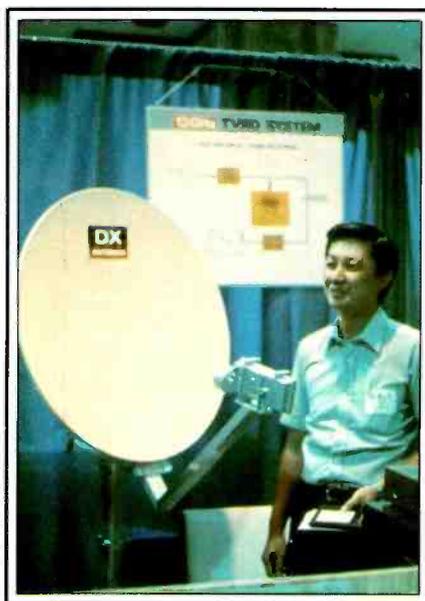
Satellite Dish Antennas

There are now more than 40,000 private homes across the United States and Canada with 10 to 15 foot dish antennas gracing their lawns, and it is estimated that this number will grow to well over 100,000 within the next two years. More and more people are noticing the appearance of these large dish antennas in their communities and the inevitable question usually is "why do they have to be so big?"

The size of any earth station antenna is extremely important in regard to the over-all performance of the receiving system. Today's 4 GHz satellites are transmitting their signals at extremely low power levels, usually in the neighborhood of 5 to 8.5 watts. By the time these signals travel over 22,000 miles and are dispersed over a large section of North America, they are extremely weak. Dish antennas utilize a large surface area in order to capture as much signal as possible. The dish surface conforms to a parabolic curve, which causes the incoming satellite signal to be concentrated onto a common spot (called the focal point), which lies above the center of the dish. Satellite signals are reflected by the metal surface of the dish itself, much like a mirror reflecting light.

Many newcomers to satellite TV have been enticed by media reports about an upcoming satellite service that will use a miniature 1.5 to 2 foot dish for reception. Many of them want to know why they should dedicate a significant portion of their backyard space to something that looks like the Jolly Green Giant's frisbee, when in a few years a tiny dish pointed out the living room window will suffice? Direct Broadcast via Satellite (DBS) is indeed coming and this new service will use a new frequency band in the 12 GHz range. Since the much higher frequencies around 12 GHz have a wavelength of only 1/3 of what a 4 GHz signal does, this makes it possible for a 4 foot antenna on 12 GHz to exhibit the equivalent performance of a 12 foot dish at 4 GHz.

Additional size reductions are possible because of other factors. The present 4 GHz satellite band shares frequencies with terrestrial microwave telephone services that crisscross much of North America. In order to prevent interference to telephone services, satellite transmissions in the 4 GHz band are limited to low power levels. The new 12 GHz DBS band will be exclusively set aside for satellite use and DBS satellites will be able to increase the signal levels that reach the earth's surface by using higher power transmitters and regional spot beams. These improvements over satellite transmitting techniques help make the small dish possible.



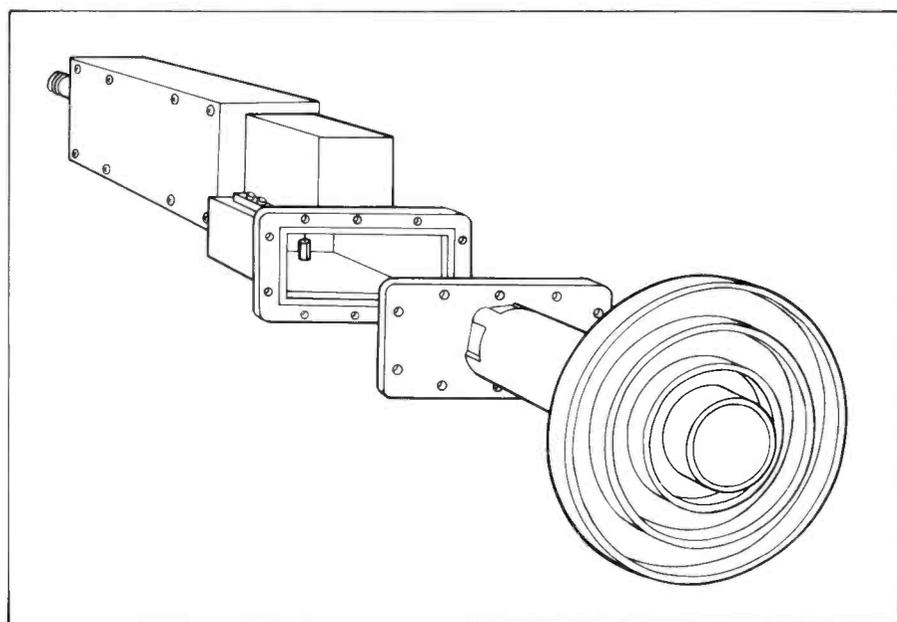
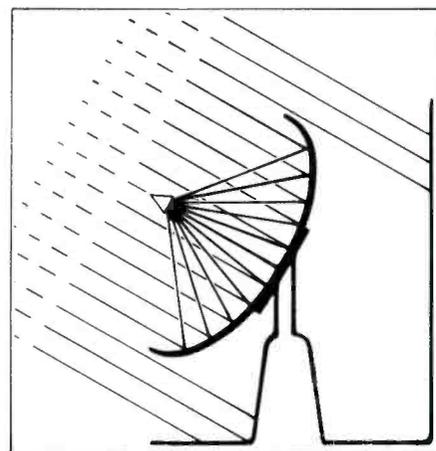
SPACE 82 show saw early entry of DX Antenna into the 12 GHz DBS equipment field.

Photo by Jerry Miller.

But there will be disadvantages. Since there is only a limited amount of solar power available on board each bird, more power per DBS channel will mean less channels per satellite. Also, many of the DBS companies will have their own unique scrambling systems which will make it difficult for manufacturers to provide a universal receiver that can switch between the various DBS satellites. When faced with a choice between

a future service that will offer only a few channels of unproven programming and an already existing system that has over 100 channels available right now, the choice should be obvious, even if it does require a larger antenna to do the job. And considering that hundreds of millions of dollars have already been invested in a number of new 4 GHz satellites with a ten year lifespan, it is certain that the number of video transponders available for viewing will grow even larger during the rest of the 1980s.

The parabolic dish is the most visible portion of the earth station antenna system. But it is nothing more than a reflector. At the focal point of most antennas there is a feed-horn and a Low Noise Amplifier. The feed-horn conducts the signal present at the focal point back to the mouth of the LNA with a



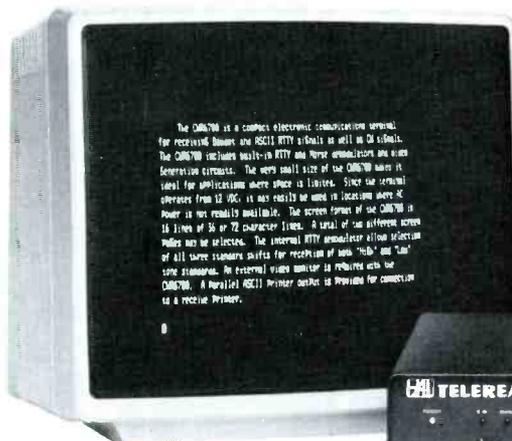
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- KB2100 Keyboard Available for Transmit
- Requires External Video Monitor (KG12NU Shown)



CWR6700

- Baudot or ASCII RTTY—45 to 300 baud
- 4-50 WPM Morse Code
- High and Low Tone RTTY Demodulators
- 72 or 36 Characters per Line 2 Page Video Display
- ASCII Printer Output
- 12 VDC, 0.8 Amp Power Input
- Requires External Video Monitor (KG12NU Shown)

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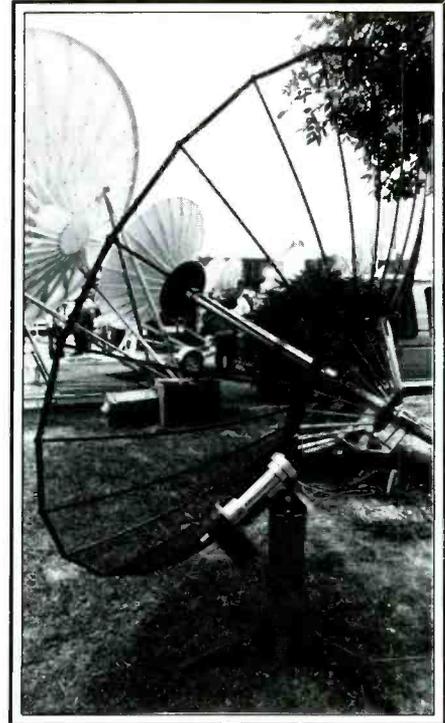
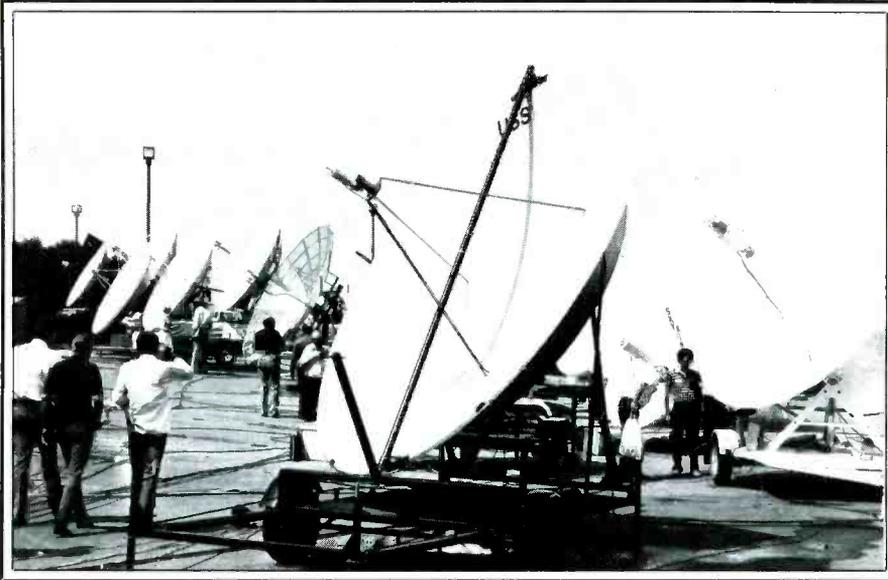


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*Lulu umbrella antenna with ADM 20 and 11 foot aluminum dishes in the background.
Photo by Jerry Miller.*



*Pressure-molded fiberglass-reinforced plastic dish, 10 feet in diameter, achieves necessary precision for maximum performance.
Photo by Jerry Miller.*

minimum of signal loss. Within the LNA's mouth is a short metal probe less than an inch long. This is the actual $\frac{1}{4}$ wavelength resonant antenna and it directly couples the signal that's delivered by the feedhorn to the first stage of electronic amplification.

Today's marketplace offers a wide selection of parabolic dish antennas to choose from. A few months ago, I attended the first SPACE satellite convention and exhibition in Omaha, Nebraska. SPACE (The Society for Private and Commercial Earth Stations) is a trade organization that represents the manufacturers, distributors, and owners of satellite reception equipment. Its efforts in representing this young industry to Congressional and governmental bodies have been instrumental in protecting our right to receive programs carried by satellites over North America. ** The first annual SPACE trade show provided a dazzling array of satellite hardware, with over 61 dish antennas being displayed in the Holiday Inn parking lot, more antennas at one particular location than had ever been together before!

** If you would like to learn about SPACE and their efforts to promote the home earth station industry, you can contact them at 1920 N Street N.W., Suite 510, Washington, D.C. 20036, phone (202) 887-0605.

The antennas present at the show fell into three major categories: aluminum, fiberglass, or wire screen construction. All three types of dishes can provide equally good reception for a given size. The performance of any type of parabolic antenna is primarily governed by the accuracy of the dish's curvature. This is largely a function of the precision of the mold or dye used by the manufacturer to produce the dish. The accuracy of any dish antenna is enhanced by the structural support given to the dish itself and by the quality of the materials used.

The steel mount and associated support bearing which holds the dish antenna is very important since it not only carries the full weight of the dish but must also maintain a precise position once sighted onto a satellite. Parabolic antennas "see" only a narrow cor-

ridor that lies directly in the front and center of the dish. They must be accurately pointed at a satellite for reception to occur. Changes in alignment as small as an inch can make the difference between a good picture and no picture at all. One good test for any antenna is to grab its rim and shake it. If the dish support has a significant amount of slop in it, then the wind and rain will be able to shove it about, which will make for erratic reception.

Most of the dish antennas sold in the consumer market use the "prime focus" feed method, where the feedhorn and LNA are mounted right at the focal point, held in place by a tripod or single member support. The feedhorn must maintain its position exactly over the center of the dish at a certain distance away. A sturdy support structure for the feedhorn and LNA is important since being off an inch or more can be critical here as well. The other main feed method used for parabolic dishes is the Cassegrain, which utilizes a subreflector at the focal point to reflect the concentrated signal down to the feedhorn and LNA. They are then mounted right at the center of the dish itself. This type of feed is mainly used on dishes 15 feet or larger in diameter.

Most dishes are constructed out of a number of individual petals. This simplifies the shipping procedures for the dish manufacturers, but it can also be a way that inaccuracies are introduced into the dish surface after assembly. When examining any dish, you should look at how the various petals fit together. Does the surface look like it is continuous with little variation from petal to petal? Keep in mind that variations in curvature of as little as a quarter of an inch can affect the performance of your system.

Some mesh dishes proved to be better than others in regard to the methods used for fastening the screen to the support members. Mesh dishes are perhaps the most susceptible to damage from the elements, having less resiliency when compared to most fiberglass models and less structural strength than the aluminum ones. But they have the least impact environmentally and stand the

least chance of drawing complaints from neighbors in crowded suburban areas.

Fiberglass is by far the most common material used for dish manufacture. There are a variety of techniques used by manufacturers to make fiberglass dishes, from spraying layers onto the mold on up to pressure-forming fiberglass-reinforced plastic. All fiberglass dishes contain a wire mesh or other metal re-

flector within them. Otherwise, the satellite's microwave signals would pass right on through the fiberglass instead of being reflected on up to the LNA.

One unique design exhibited at the show can provide RV owners and other travellers with a completely portable antenna system that will fold up into a duffle bag. The Luly antenna collapses like an umbrella and comes in 8, 10, or 12 foot sizes. Weighing less than 25 pounds, the Luly antenna uses a silver impregnated nylon net for its reflective surface and can be mounted on a modified camera tripod for temporary use. This antenna received high recommendations from field technicians as ideal for demonstrations and site surveys.

Some exhibitors displayed dishes in the 6 to 7.5 foot size that were receiving television signals. For some limited applications, this might be an idea worth considering. But this size is marginal, and noise-free reception is possible from only the most powerful satellite transponders, and even then only when your location is within the center of that satellite's footprint. Generally, it is best to use the 8.5 foot dish as the minimum standard for satellite television reception at the center of a particular satellite's footprint. Most systems today use a 10 foot dish in order to leave a little margin for error in the system. Even larger sizes are required at locations out on the edges of the satellite's footprint. The satellite manufacturers themselves inform the cable companies that, during the lifetime of any satellite, the power levels transmitted will drop slightly. Also, the aging of the earth station equipment itself can cause a slight degradation in its performance. Giving yourself a little margin when selecting your system can insure that your pictures will stay out of the noise throughout the lifetime of both the satellite and the receiving earth station.

I have dealt with several aspects of the parabolic antenna, which is by far the most popular type of home satellite antenna in use today and the only type displayed at this past summer's SPACE convention and exhibition. Other antenna types like the torus or spherical have certain limited applications for commercial or hobbyist installations. They will be the subject of a future column which will deal with their somewhat different parameters of operation.

Interested in finding out more about satellite reception? The *World Of Satellite Television* by Mark Long and Jeffrey Keating is now available from The Book Publishing Co., 156 Drakes Lane, Summertown, Tennessee 38483. Price: \$7.95.

May We Recommend . . .

The National Radio Club, P.O. Box 118, Poquonock, CT 06064. This is the oldest and largest club devoted exclusively to AM broadcast band (535-1605 kHz) monitoring and after 50 years of operation they really speak with authority in their publication, *DX NEWS*. In addition to a number of specialized publications on their prime subject, they publish their *DX NEWS* on a weekly basis during the DX season and monthly the rest of the year. If you've got an interest in DXing the broadcast band ("BCB") you'll want to check out the NRC. Their initial membership fee, including a First Class Mail subscription to *DX NEWS*, is \$18. They'll send you descriptive literature on their club if you send them an SASE.

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DX'ing The Dominion

BY GERRY L. DEXTER

Oh, Canada! Northern giant. Second largest country in the world. Longest undefended border in the world. Home of ten individual provinces, a new constitution, Sergeant Preston. And some interesting DX targets and shortwave listening sources.

Like most nations, Canada has its official overseas voice, in the form of Radio Canada International, headquartered in the modern Maision Radio Canada building with its 25 story tower outside Montreal. From there, programs are fed to the RCI transmitter complex at Sackville, New Brunswick.

In the beginning, though, things were a little more modest. The Voice of Canada, also known as the CBC International Service, aired its first test transmissions on shortwave on December 16, 1944, over 50 kilowatt station CKNC on 17.820 megahertz. Regular programming began on Christmas Day, 1944, with programs in English, French, and German beginning the following day.

During the following years, new services, additional languages, special programs, and special event coverage were added as part of a steady stream of growth. A third 50 kilowatt transmitter was added in 1962.

Nearly ten years later, in 1971, test transmissions began from the first 250 kilowatt transmitters installed at the Sackville plant which, of course, greatly improved coverage for Canada's overseas broadcasting efforts. Incidentally, two of the three 50 kilowatt units are still going strong, giving daily service on shortwave.

To go along with the new power, the station's name was officially changed to Radio Canada International in 1971. Today, Radio Canada International broadcasts to Eastern Europe, Latin America, Africa, Europe, North America, the Middle East, and the Caribbean on a wide variety of frequencies (see chart).

Radio Canada International also uses facilities of the British Broadcasting Corporation in England to provide better coverage to some areas. Programs are fed to the British transmitters via undersea cable.

The CBC (Canadian Broadcasting Corporation) also airs many of its domestic programs over shortwave in the CBC Northern Service, which is a popular source of information and entertainment for many shortwave listeners.



Two of the CBC's domestic, medium wave stations, are relayed over shortwave frequencies. DX'ers tuning for these have to exercise some care in identification since they are both on the same frequency—6.160 MHz!

Three hundred watt CKZN at St. John's, Newfoundland, relays the programs of CBN of that city. The slightly more powerful 400 watt CKZU is located on the other side of the continent at Vancouver, British Columbia, and relays the local station CBU in Vancouver. Both stations operate in English.

In addition to government-operated broadcasting, Canada has a handful of private stations operating on shortwave.

CFRX, 6.070 MHz, is the shortwave outlet for CFRB in Toronto, duplicating the programming of the medium wave station 24 hours per day with 1,000 watts. The transmitter is 20 miles from Toronto, at Clarkson. Two-50 foot towers beam the programs to Northern Canada, but the majority of the station's listener response actually comes from the United States! Identifications for CFRX shortwave come hourly around 25 minutes past each hour.

The spot for CFCX from Montreal is 6.005 MHz relaying the AM programs of CFCF Radio. The broadcast band outlet, incidentally, claims to be North America's first radio station, having gone on the air back in 1919! CFCX also operates 24 hours a day

RCI transmission/production studio in Montreal.

Three of a total of five 250 kw. transmitters located at Radio Canada International's transmitter site at Sackville, New Brunswick, Canada.

CFCX in Montreal sends out this QSL, which is bright green. Data about each of the company's four stations (AM-FM shortwave and TV) is on the back.

QSL card and decal from CHNX on 6130 from Halifax, Nova Scotia.

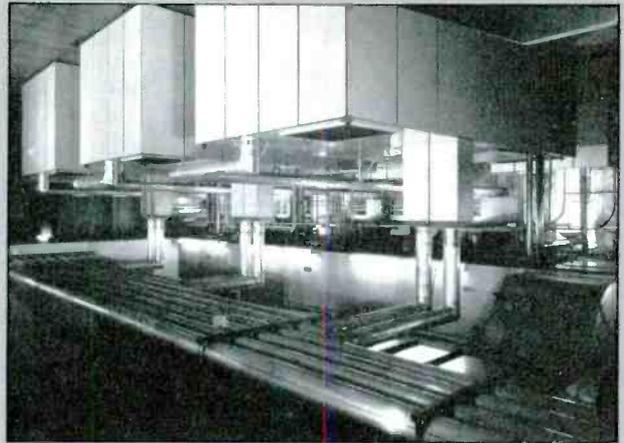
Super country. Ten watts worth. The QSL from CKFX Radio, Vancouver.

Radio Canada International's new monitoring station at Stanley Corners, Stittsville, is equipped with receivers capable of monitoring international shortwave broadcasts beamed to Canada by foreign countries. Upper left you will notice two clocks. The one on the left indicates Greenwich Mean Time by which all international broadcasts are scheduled, while the one on the right shows Ottawa's local summer time.

This is the exterior view of the RCI transmitter plant in Sackville, New Brunswick.



1



2



Greetings from Nova Scotia

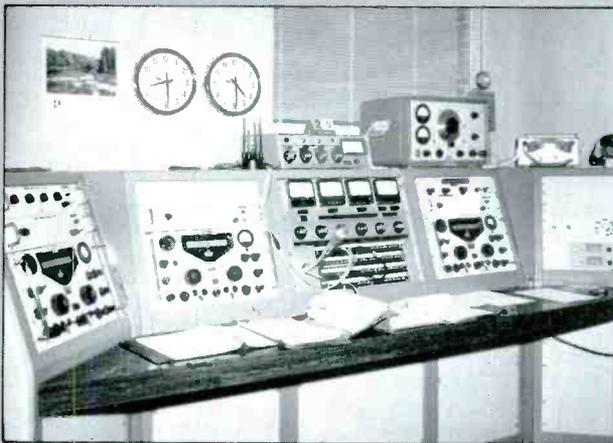
Canada's Ocean Playground

4

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5



6



7

and carries a good deal of live sports. Power on this one is 500 watts.

Moving up in frequency and moving west on the map we come to the Voice of the Prairies, CFVP on 6.030 MHz from Calgary, Alberta, which is the shortwave relay for CFCN. This one is rather difficult to log. And the power is a mere 100 watts.

CHNX on 6.130 MHz from Halifax, Nova Scotia, has been on the air since 1929, although back then its call letters were VE9HK. Again, the shortwave relays the medium wave—mostly! During the baseball

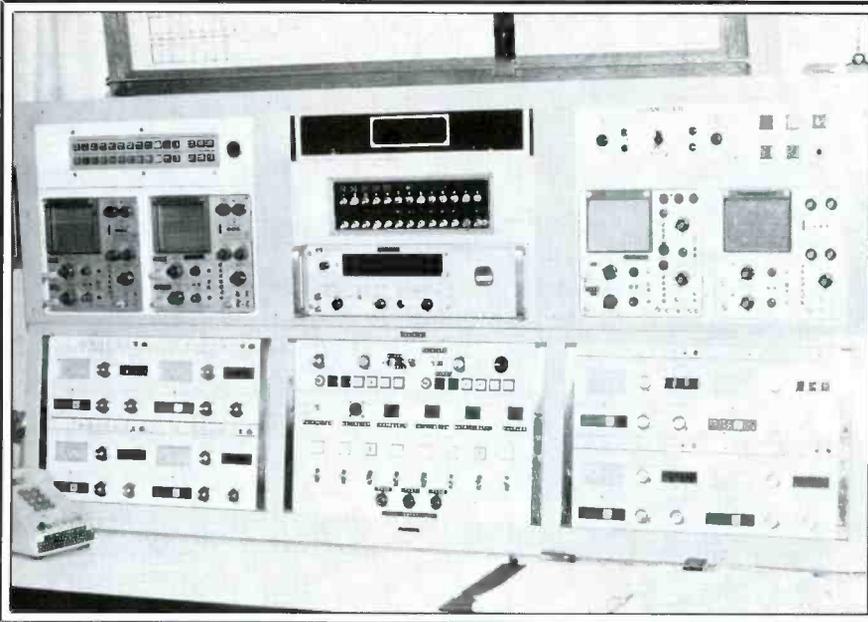
season, CHNX relays its FM sister station, CHFX, providing wider coverage for Montreal Expos games. CHNX is another 500 watt and is on the air 24 hours a day. The station provides coverage of the Maritime Provinces.

Here's a tough one. CKFX on 6.080 operating with just ten watts! The station began operating in the 1930s to serve people living in the isolated inlets of the British Columbia Coast as well as fishermen at sea. CKFX relays its medium wave sister CKWX both in Vancouver, British Columbia. Despite its

low power, the station gets a great number of DX reports from around the world, although most are from the United States.

There's yet one more Canadian shortwave station to tune—The Dominion Observatory's time and frequency station CHU in Ottawa, Ontario. "Utility" DX'ers count it as a utility station, but many shortwave listeners count it as shortwave broadcast since its use of voice announcements is taken to mean its service is intended for a general audience.

CHU can easily be heard on any one of its



This is the transmitter monitoring position at the RCI Sackville transmitter plant.

Radio Canada International

Main Frequencies

5.960	9.615	11.905	15.440
5.965	9.625	11.915	17.820
6.015	9.650	11.925	17.860
6.085	9.730	11.940	17.875
6.140	9.755	11.945	21.695
6.195	9.760	11.960	
7.155	11.720	15.150	
7.235	11.770	15.190	
7.260	11.775	15.260	
9.535	11.825	15.265	
9.555	11.845	15.315	
9.575	11.850	15.325	

Courtesy: World Radio TV Handbook

three frequencies—3.330 with 3 kilowatts, 7.335 with 5 kw., or 14.670 with 3 kw. Time announcements are given each minute 'round the clock in both English and French. CHU's address is National Research Council, Ottawa, Ontario, K1A 0R6.

All of the stations we've discussed are good verifiers. However, there are some special terms for Radio Canada International. You must get on the mailing list for RCI's twice-yearly program schedule, which contains a blank QSL card. The listener then has to fill out the card and return it to RCI for certification.

Canadian shortwave broadcasting provides interesting and "timely" material for the listener and more than a few challenges for the DX fan. That makes for a great shortwave combination!

Canada On Shortwave

Call	Relays	Frequency	Power	Address
CFCX	CFCF	6.005	500 watts	405 Ave. Olgivy, Montreal, Que. H3N 1M4
CFVP	CFCN	6.030	100 watts	Box 7060, Station E., Calgary, Abta T3C 3L9
CFRX	CFRB	6.070	1,000 watts	2 St. Clair Ave W., Toronto, Ont M4V 1L6
CKFX	CKWX	6.080	10 watts	1275 Burrard St. Vancouver, BC V6Z 1Z8
CHNX	CHNS	6.130	500 watts	P.O.Box 400, Halifax, NS B3J 2R2
CKZN	CBN	6.160	500 watts	P.O.Box 12010, Station A., St. Johns, NB A1B 3T8
CKZU	CBU	6.160	500 watts	P.O.Box 4600, Vancouver, BC V6B 4A2

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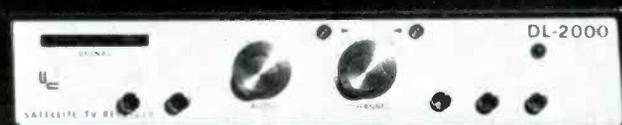
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Line Noise Interference Elimination

BY N.C. OLDENBURG, KFL4RH

Anybody who has used receiving equipment—be it a scanner or a communications receiver—can undoubtedly recall times when reception has been degraded by someone turning on electrical apparatus such as a vacuum cleaner, electric razor, hair dryer, power tools, fluorescent lights, oil burner, and any other of a dozen commonly found enemies of radio communications. The grinding of the operator's teeth usually begins about 1 millisecond after the humungous buzzing sounds commence; this generally coincides with attempts to hear a particularly difficult station ID.

Actually, there are several ways of fighting back at the affront to your monitoring pleasure. They (one or the other, or both together) should eliminate this problem, no matter how stubborn the buzzing.

Power Lines — The Root Of The Problem

The problem is that these various interference generators are miniature wideband radio transmitters (in a sense) in that they pour out all manner of unwanted RF energy, feeding it right into the 117 volt power lines. Yup, the very same power lines you are using to operate your receiver or scanner. These "signals" sneak into your receiving equipment via the back door (that is to say via the power cord of your receiver or scanner), and they emerge in living color as buzzing from the loudspeaker or headset.

Basically, your reception is getting stabbed in the back. Unless you switch over to battery operation, you're forced to make do with the annoying noises, that is, unless you can arrange for the unwanted "signal" to be strangled, beaten down, filtered, or otherwise kicked out before it tiptoes into your receiving gear. That's where these little gizmos

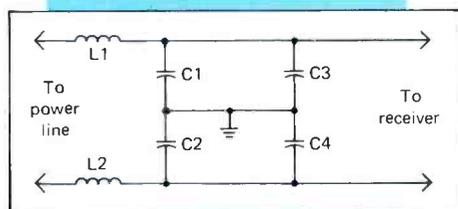
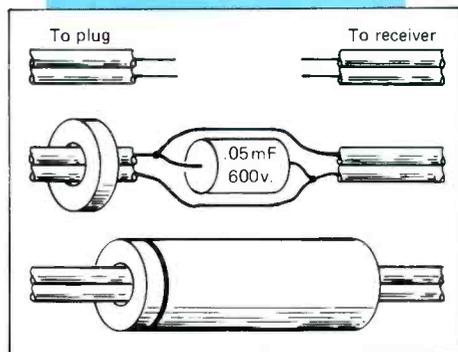
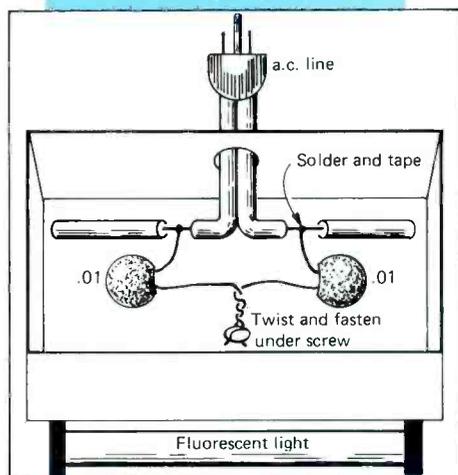
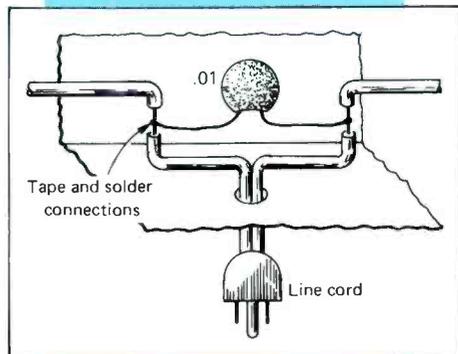
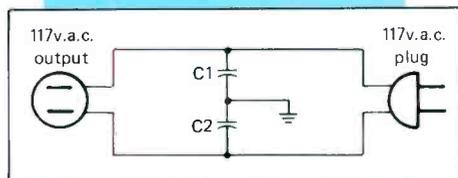
come in. Their job is to sidetrack the unwanted RF energy before it can vex your reception.

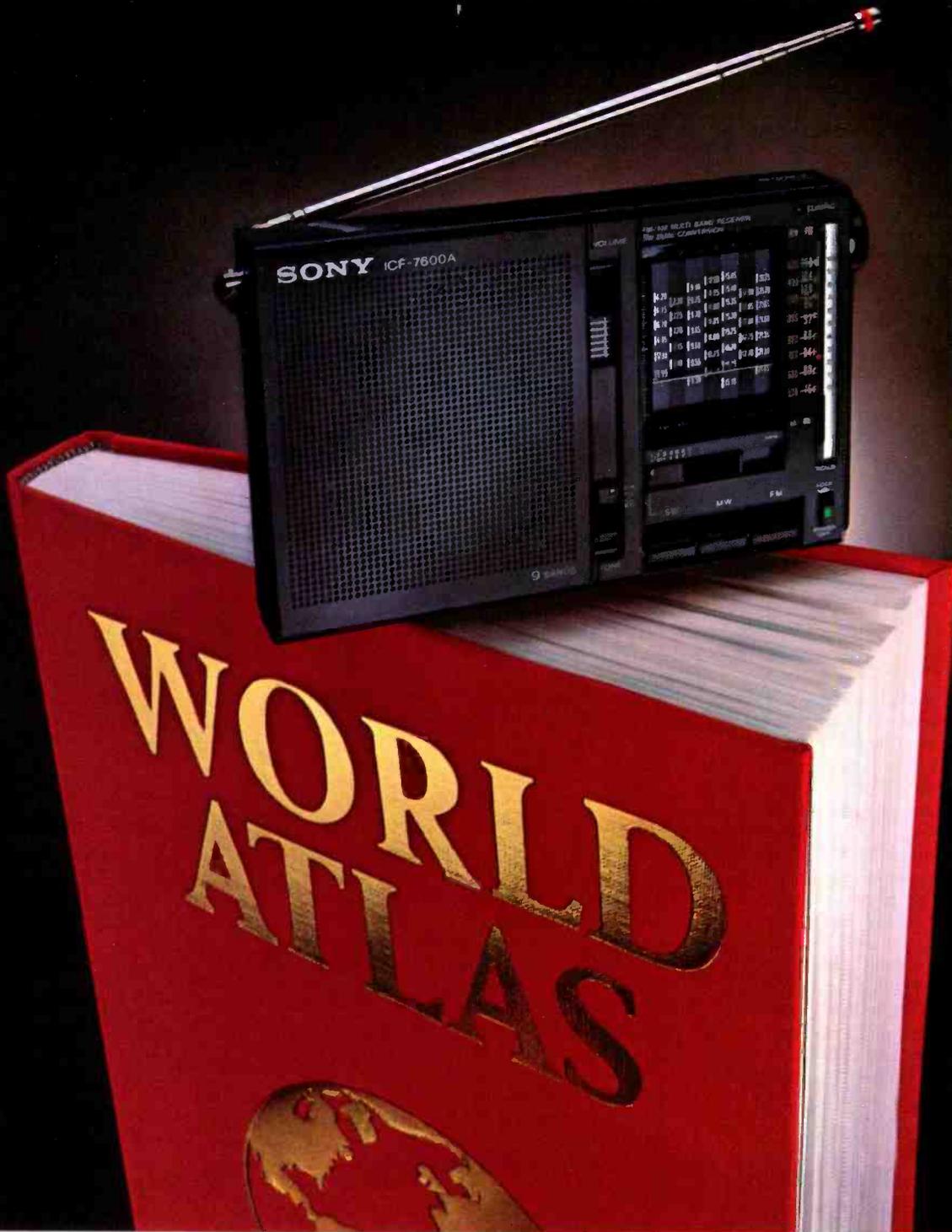
Going first to the source of the noise—the fluorescent lamp, hair dryer, or whatever—is a good place to begin. This is so simple a noise filter that it shouldn't be any hassle to install it at each potential source of electrical noise. Fig. 1 says it best. Capacitors C1 and C2 are both $.25 \mu\text{F}$ 600 volt types, and the entire circuit may be housed in a small metal can (such as a quarter pint paint can), as in the illustration. Make certain that all connections are soldered and well insulated with electrical tape. The wires which pass through the holes in the can should be protected with rubber grommets so that the metal from the can won't slice through the insulation and cause a short circuit. I suggest you use heavy duty insulated electrical wire, and don't forget to hook the grounded side of the capacitors to the grounding pin connection of the 117 volt plug.

A simple approach to getting some of the noise out of a fluorescent lighting fixture or desk lamp is shown in Fig. 2. Unless the fixture is located within a few feet of the receiver, this should prove to be effective.

To attack the noise problem from fluorescent desk lamps, first pull the power cord from the wall socket and then open up the case of the lamp. Find the point where the cord enters the case and carefully remove some of the insulation from the wires as illustrated. A $.01 \mu\text{F}$ capacitor is soldered across these leads and carefully taped with electrical tape to ward off short circuits. When you plug the lamp back into the wall, turn it on (with the scanner or communications receiver) and you'll probably be pleasantly surprised to see that the buzzing has stopped!

If your fluorescent noise is coming from a ceiling type fixture, you're going to have to





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first remove the electrical power from that fixture by means of switching the circuit breaker controlling it to "off" (I don't mean the wall switch, I mean the one in the circuit breaker panel), or else removing the fuse in the house's fuse panel. Install two .01 μF capacitors as shown in Fig. 3. Note that the leads from these capacitors are twisted together and connected to a nearby screw on the fixture case. Since this is an electrical ground connection, scrape away any paint that might cause a poor contact. Securely tape any bare leads with electrical tape to avoid shorts.

The Other End Of The Problem

If there is any residual noise coming through, you can go further still. Add some filtering to the receiver or scanner, right in the unit's power cord.

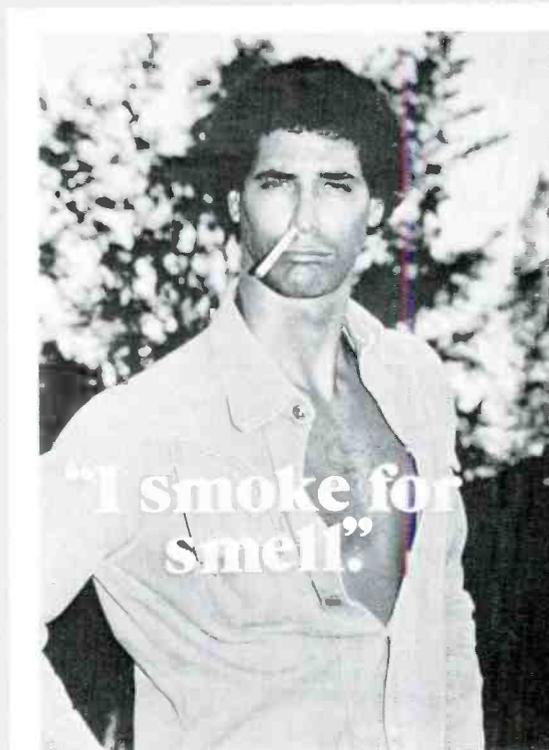
Using a small plastic pill bottle as a container for the circuit (or a plastic tube for holding stacks of 50¢ pieces—these are sold at all coin shops), the whole deal consists of the circuit shown in Fig. 4. Although a .05 μF 600 volt capacitor is shown, good results were also obtained with a .001 μF 400 volt capacitor. Naturally, the scanner or receiver should be unplugged from the wall when you install this capacitor, and the connections should be soldered and carefully wrapped with electrical tape. This can even be added to the power cord of a small appliance, such as an electric razor, which is generating noises in your receiving gear.

Heavier filtering than this can be accomplished by constructing a circuit for use between the scanner or receiver and the power outlet, this time containing RF chokes to really zap the noise with a brickbat. This can be put into a small metal box. Make sure that the circuit (Fig. 5) is well insulated from the box (with all connections soldered and properly taped with electrical tape) to avoid shorts and shocks.

The two coils (L1 and L2) are the RF chokes and are homemade using a thick wooden dowel (such as a 5" long section of a wooden handle from a shovel or hoe) as a winding form—should be about 2" in diameter. Wrap 100 turns of #16 insulated bell wire (close wound) on this form, and then backwind another 100 turns over the first winding. Both coils are formed in this manner. Wrap electrical tape over each coil to keep it from unwinding; or, you can coat it with epoxy or Duco cement.

Capacitors C1 and C2 are .22 μF 600 volt types. Capacitors C3 and C4 are .1 μF 600 volt jobs. Wire them into the circuit as shown in the schematic. The grounding connection is to the grounding pin on the 117 volt plug. This circuit can also be added to small appliances, causing radio noise.

These devices should take care of any interference sneaking in via the power lines. If these don't do the trick, then you might consider forgetting about radio and taking up stamp collecting—the stamps look good under the fluorescent lights.



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Panasonic RF-6300



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POP'COMM Scans The

Burns International Security Services

BY RICK MASLAU, KNY2GL

The Burns International Security Services, Inc., describes itself as having "selectively recruited, trained, and equipped personnel." If you've ever had occasion to listen to the communications of this well run national organization, you'll certainly agree with that description. Burns International Security provides security consulting, integrated electronics security systems, and also investigative services.

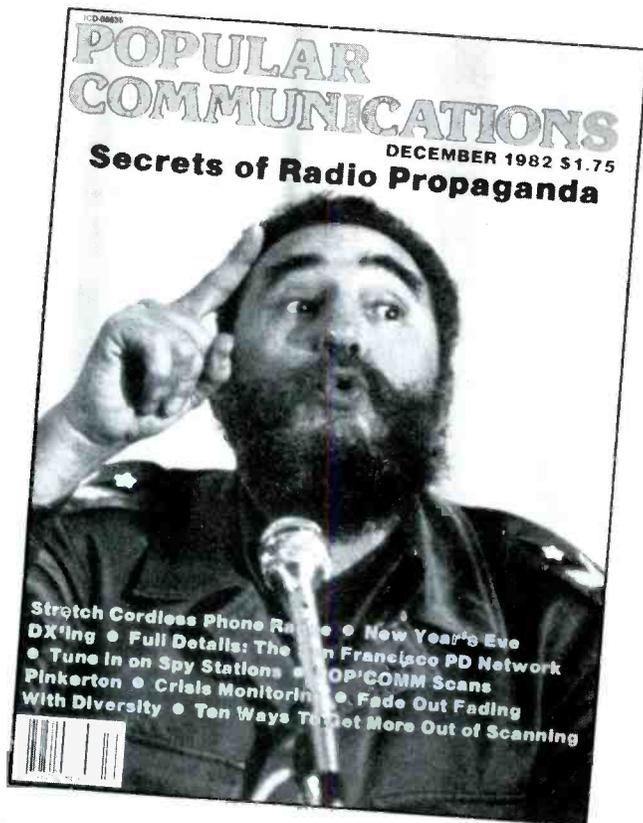
Here is a listing of the communications systems operated by Burns International Security:

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CA	Claremont	KLN494	461.825			WAX709	463.85
	Los Angeles	KBT98	461.825	KS	Burlington	WAX710	463.85
	Los Gatos	KE9936	461.825	LA	Shreveport	KV8494	463.85
	Montrose	KQW795	461.125			WQP892	464.675
	Sacramento	KBC959	461.825	MI	Pontiac	WDX799	461.975
	San Francisco	WAA379	461.125	NJ	West Orange	KA30711	461.975
	Sausalito	KXT53	461.125			KAB0814	462.675 462.70
	Walnut Creek	KVW598	461.125			KVU873	472.2875
CO	Morrison	KJD711	461.125	NM	Albuquerque	KHM68	472.2875
		KYJ907	464.80 469.80			KR8883	472.2875
		KV4098	464.80 469.80	NY	Hartsdale	KGY985	151.805
FL	Ft. Lauderdale	KZM642	464.60	OR	Portland	KM7644	151.805
	Miami	KYI465	464.70			KWH243	30.80
		KYI466	464.70	PA	Philadelphia	KYP501	154.54
		WAX385	464.70			KA70139	466.125
	Miami Springs	KU7233	464.70			KON578	502.1375
		WBP367	464.70			WID537	502.1375
		WBP368	464.60			KXX44	502.1375
GA	Atlanta	WDR572	463.475			KK5235	502.1375
		WXD899	463.475			WLB96	461.525
		KP5069	463.475			KO7122	461.525
HI	Honolulu	WRB925	461.975	PR	Jayuya	KYY520	460.975
		WRB926	461.975			WBH323	460.975
		KA54203	461.975			KYY521	461.70
	Kula	WSC541	463.30			KYY522	461.70
		KA62824	463.30			WBH326	460.975
	Wailuku	WGF290	463.30			WBH325	460.975 461.70
	portable	KDM210	151.625	TX	Dallas	KDM210	151.625
						KNM644	484.7625
						KB2769	484.7625
						WEA979	484.7625
						KXT551	463.85
						WAW516	463.85
						KU5669	463.85
						KJF505	151.955
						KBM479	463.55
						KAB3398	467.70
				US	El Paso	KDM210	151.625
				WA	Houston	KJE674	154.54
				WI	Seattle	KWK527	464.475
					portable/mobile	KAH227	464.475
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					Cudahy		
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MONITORING THE 30 TO 512 MHz "ACTION" BANDS

Monitoring Hints

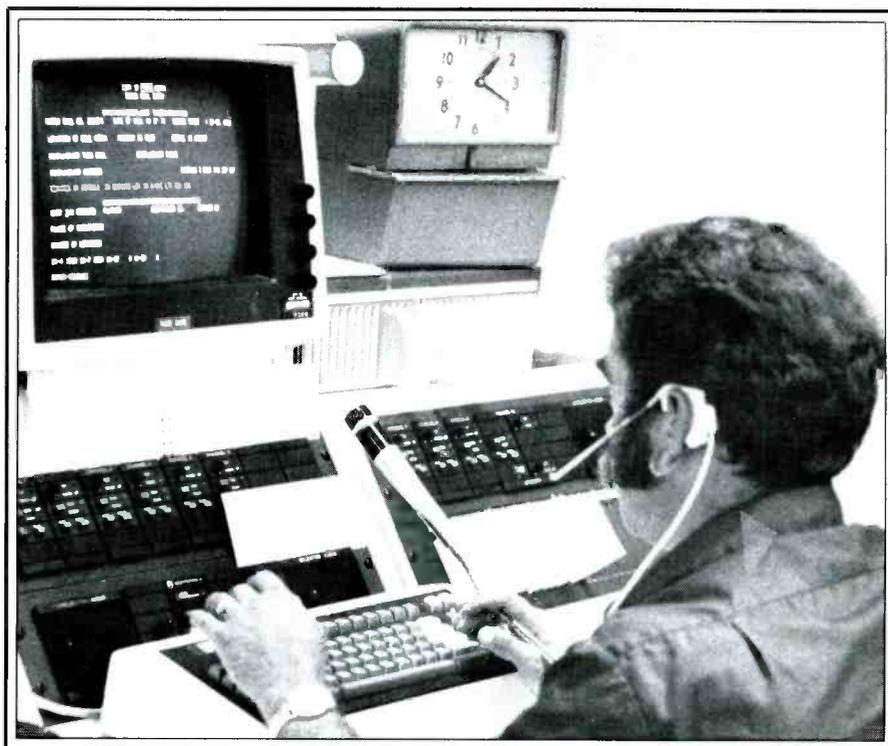
Perhaps the most important frequencies for the scanner owner to monitor are the "intercity" or "intersystem" channels. Sometimes specifically designated by the FCC (155.475 national; 39.46, 45.86 for police), these frequencies may be found anywhere within the police, fire, or local government sections of either the VHF or UHF bands and have many varying usages. Why are these frequencies so important? Very simply, every scanner owner has a limited number of channels in his receiver with which he can monitor. Thus, there is no possible way (unless one lives in a completely rural area) that all important police and fire frequencies can be listened to at once.

Since a major fire or criminal act may occur anywhere at anytime, it really is essential that we as scanner buffs have some contact with every community possible; general alarm fires, 100+ mph chases, and the like just happen too infrequently for us to not care about missing them. The intercity frequencies are the answer to the problem. If a crook is being chased from one town to another, there has to be some way that the two police departments can communicate with each other as to the exact location of the vehicles involved. Some intercity channels are licensed for base use only and, in the example of the car chase, this poses some problems: each time the cruiser in town A wants to notify town B of his whereabouts, he must radio his station on one frequency and they must then switch to their intercity unit, call and notify the town B who must then get in touch with their mobile units on their own local frequency. This back and forth communicating over the intercity channel can really bog down operations of any type, especially vehicle coordination during a chase, but it is still better than nothing at all.

A far more versatile type of intercity set-up is the base and mobile type. This, of course, would allow cruisers from different towns to communicate with one another during a chase, thus saving the time normally spent going through the police headquarters. Mobile only systems are not very popular at all unless it is used as a channel separate from the normal intercity frequency.

One way that mobiles can talk privately with one another is for the cruisers or portables to operate on the talkaround channel when a repeater system is in use. In the 450-470 MHz range, the talk-around frequency is exactly 5 MHz above the channel that is regularly monitored. In the 470-512 MHz range, the split is 3 MHz. Repeater systems can be set up on any band, although they aren't very prevalent in the VHF low range.

In the upcoming months we'll be taking a



Intercity police channels offer interesting monitoring not found on other frequencies.

close look at some actual intercity radio systems, most notably the Boston Area Police Emergency Radio Network (BAPEREN), which is one of the most innovative in the nation today. We'll also explore the growth of the nationwide 155.475 police intercity channel and the importance of fire intercity nets. Finally, together we'll explore what I like to call "alternate intercity" channels: the radio systems of the press and how they can provide us with information almost equal in importance to what can be received on the intercity frequencies.

An interesting note. Along with their 30 or so frequencies (listed from "Alpha" to "Zulu" with three or four "Uniform" channels), I have heard from a couple of sources that the Secret Service has another communications option open to them; during major (and usually outdoor) presidential appearances, the Secret Service will ask a large and local company if they can borrow their security portables. Since many huge manufacturers will need company police forces numbering in the hundreds, and since no one would normally suspect that the Secret Service would ever vary from their possible set of thirty channels, using corporate radios (probably with frequencies located within the ranges of 153.035-153.395 MHz, 158.280-158.310 MHz, 451.175-451.675 MHz, and 462.225-462.500 MHz) would

seem to be a plausible solution to a difficult security task. This poses a challenge to scanner enthusiasts who wish to search for the active business-Secret Service frequencies.

Additional Winter Monitoring

An addendum to last month's Winter Monitoring article—I inadvertently forgot to mention another one of the more fascinating services to listen in on during a winter storm: airport and airline support ground crews. Plowing and sanding the runways and taxiways of an airport is a *huge* and difficult job, and that's not even taking into account all the parking lots and highways that, too, must be taken care of. Can the "Conga" crews (a line of snow throwers, plows, sanders, and de-icers) keep the runways clear and the airport open? This challenge for the airport authority provides just plain great monitoring and should not be missed. Airline ground crews, such as the baggage and ticket services people, all must be kept well informed of travel conditions and their relation to possible flight cancellations. Usually these people can be heard in the 460.650 to 460.875 MHz range at each 25 kHz interval.

Unlike most communications in the Ultra High range though, the airport ground crew radios are usually not repeaterized and you may have to be quite close to the airport to

be able to monitor them. Other support firms, such as rent-a-car, taxi, limo and airport buses or trains, aircraft food, and petroleum loading and package pickup and delivery companies are all involved with the functioning of the airport and all instill in the scanner enthusiast, whether during a storm or not, the thrill of living the hustle-bustle vibrancy of airport activity.

If you have the capability to monitor the aircraft band, you should obviously give them a try during a winter storm too. Weather and runway condition radio traffic is incessant and the private airline channels (located between 129 and 133 MHz) are also jumping during inclement weather.

Once again that problem of receiving the airport towers comes into play though. Those low-power rigs sure can give you one heck of a headache, but if you are lucky enough to receive the controllers, the aircraft frequencies are a must. Last winter there were two major "incidents" involving weather and planes: the Air Florida crash at Washington National and the World Airways skid off the runway end at Logan in Boston. When considered, too, with the crash of the Pan Am jet in New Orleans, which went down in a violent thunderstorm, this winter the FAA, the NTSB (National Transportation Safety Board), along with the entire nation, will be watching closely the safety precautions and performance that the airline industry undertakes in an effort to decrease the chance and number of aircraft ac-

cidents. It should prove an interesting time for monitoring.

Something to watch out for. At the time of this writing it was heavily rumored that several major Japanese manufacturers were working on programmable portable scanner units of their own. One of these companies had an early entry into the police-radio market several years ago with a programmable unit that never received much consumer support. If the two firms do come out with a

unit, it should help push the major American manufacturers into devising entirely new models!

In order that I may make this column as interesting and as wide-ranging as possible, I urge you all to send in any questions, comments, or ideas that you may have. If there is a topic that you would particularly like to be covered, please let me know. It is the best and easiest way for us all to better learn and enjoy the true nuances of the hobby.

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WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

HF Spectrum For Special Industrial, Petroleum, Telephone Maintenance, And Power Radio Services Proposed

The Commission has proposed allotting High Frequency (HF) spectrum between 2 and 25 MHz for fixed and mobile communications use in the exploration for energy and mineral resources, in restoring disrupted electric power distribution systems, and in backup communications circuits. The action was in response to two petitions filed by the Utilities Telecommunications Council (UTC) and the Central Committee on Telecommunications of the American Petroleum Institute (Central Committee).

Both petitioners requested allocation of bands between 2 and 25 MHz, most of which is known as the "HF spectrum," for purposes of backup communications for existing but disrupted communications circuits that have safety of life or property implications. It is also for purposes involving the national interest where other communications circuits are not available and where their use is not feasible.

The Commission noted that while, in the past, it had limited the fixed radio services' access to HF frequencies, it has recently established the policy that the use of these frequencies in the Private Radio Services will be allowed for activities pertaining to safety of life and property and supporting activities important to the national interest (Gen Docket 80-740).

In developing guidelines to permit this additional use of the HF spectrum, while avoiding unnecessary interference to HF communications internationally, steps have been taken to assure that the use of HF spectrum would be kept to the minimum necessary to meet the petitioners' requirements. Therefore, the Commission proposed that:

- Only those persons or entities with communications requirements that cannot be met by any means other than through the use of HF frequencies will be eligible; and
- Use of HF frequencies by eligibles will be limited as set out in Gen. Docket 80-740.

The Commission proposed limiting eligibility in the Power Radio Service to utilities and power pools engaged in the distribution of electric power or the distribution by pipeline of fuels or water. In the Petroleum Radio Service, it proposed limiting eligibility to persons engaged in exploring for petroleum or petroleum products. In the Telephone Maintenance Radio Service, it proposed limiting eligibility to communications common carriers. For the repair of communications links important to the national interest and in the Special Industrial Radio Service, it propos-

ed limiting eligibility to persons engaged in or supporting efforts to explore for fuels, minerals, and metals important to the national interest or to repair fuel or water pipelines.

Details Of New Omnibus Communications Bill

Public Law No. 97-259, amending the Communications Act, puts into effect many FCC legislative proposals. Subjects addressed include lotteries, Amateur radio, private land mobile services, internal FCC rules, radio frequency interference, nonbroadcast license renewals, and CB licensing.

The new law authorizes a lottery mechanism which the FCC could elect to use for awarding licenses or authorizations in any of the services over which it has jurisdiction. The lottery provisions will operate in the following manner: (a) properly filled-out applications will be eligible for the lottery; (b) applicants having few or no other interests in media of mass communications and applicants controlled by minority groups will be accorded weighted preferences; (c) after a winner is selected, a paper and/or oral hearing may be held if the Commission specifies substantial and material questions of fact concerning the winning applicant, and (d) the license will be granted if the applicant prevails or a new lottery will be held if the applicant does not prevail.

The Amateur radio rules have been amended to allow the FCC to use volunteers to assist in preparing and administering Amateur radio license examinations and to assist in monitoring for violations. Amateur radio volunteers will be exempted from the interception prohibitions of Section 605 of the Communications Act.

In coordinating the assignment of certain private land mobile and fixed service frequencies, the FCC is authorized to accept assistance from private coordinating committees. The new law also creates a detailed and specific definition of private land mobile service (PLMS), making it by law distinct from radio common carriers.

FCC Commissioners and employees will be allowed to own interests in entities that do not have a "significant interest" in communications, manufacturing, or sales activities subject to Commission regulation. This change relaxes the excessively strict provisions under the previous law whereby Commissioners and employees generally are prohibited from owning interests in entities that have only a passive involvement in Commission-regulated activities.

The Commission will also be able to accept direct reimbursement from private entities for travel expenses incurred in attending privately sponsored functions.

The Commission also is authorized to re-

quire, for example, a minimum shielding and filtering capability on "home electronic equipment and systems" in order to protect such equipment from radio frequency interference (RFI). Equipment and systems covered by this section include radio and television sets, burglar alarms, and automatic garage door openers.

Other changes allow the FCC to grant nonbroadcast license renewals for terms of up to ten years and eliminate the requirement for licenses for individual Citizens Band operators.

New Experimental Stations

The FCC Office of Science and Technology, Frequency Liaison Branch, has taken the following actions:

KM2XGY, Phillips Communications, Inc. Various temporary locations. Granted License for a new experimental developmental station to operate on 158.370, 463.2875, 464.9625, 468.2875, and 469.9625 MHz to develop a battery operated, self-contained natural gas flow meter.

KM2XGZ, Anderson Mavor (U.S.A.) Ltd. Continental U.S. Granted License for a new experimental developmental station to operate on 151.520, 151.535, and 158.385 MHz to demonstrate radio controlled coal mining equipment.

KM2XHB, Howe Richardson Scale Co., Clifton, NJ. Granted License for a new experimental research station to operate on 154.600 MHz, 464.500 MHz, and 26.965-27.405 MHz band for testing of new design weighing equipment for compliance with the U.S. Government Weights & Measurement requirements.

8888/8895-ED-PL-82, GSC Systems Development Corporation. Granted License for new experimental developmental stations to operate on 825-845 MHz. 870-890 MHz bands to run propagation studies in 800 MHz range at the following locations in Massachusetts: Methuen, Brockford, Beverly, Boston/Beacon Hill, Dedham, Lowell, Lynn, and Bridgewater.

KM2XHK, Eaton Corp. Various airports. Granted CP and License for new experimental research stations to operate on 121.6-121.925 MHz in 25 kHz; steps to communicate with the airdrome control station at specific airports where applicant is demonstrating and testing microwave landing systems.

KM2HHO, RCA Corp. New York. Granted License for a new experimental research station to operate on various discrete frequencies between 3102 and 15057.6 kHz to collect data required for preparation of new government contract proposals.

KM2XHP, Space Services Inc. Of America. Matagorda Island, TX. Granted License for

a new experimental research station to operate on 449.95, 2750 MHz and 2251.5 and 2800 MHz to provide communication in the launch of a rocket.

KM2XHS, Bell Telephone Laboratories, Inc., Continental U.S. Granted License for a new developmental station to operate Radio Frequency Devices in accordance with Part 15, Subparts C, D, E, H, and J, which have not been through certification or verification procedures.

KM2XHT, GSC Systems Development Corp. Waltham, MA and KM2XHU, GSC Systems Development Corp., Needham, MA. Granted Licenses for new experimental developmental stations to operate on 825-845 and 870-890 MHz bands to run propagation studies in 800 MHz range.

KM2XHV, General Electric Radio Services Corp., Jacksonville, FL. Granted License for new experimental developmental station to operate on 870-890 and 825-845 MHz to set up and develop competitive and efficient cellular service.

Show Cause Order Issued To Speed-O-Matic Company

The Commission has issued to Speed-O-Matic Company, Harbor City, CA, an order to show cause why its velocity measuring device, the SPEEDO-1 field disturbance sensor, should not be decertified because of unauthorized equipment modifications.

The Commission certified the SPEEDO-1 sensor in April, 1980 under Part 15 of its rules for restricted or incidental radio devices. In response to complaints by law enforcement officials, the FCC Laboratory of the Office of Science and Technology and the field staff of the Field Operations Bureau found that Speed-O-Matic had made two unauthorized modifications to the previously certified model enhancing its capability to interfere with police radar units.

Amateurs Authorized New and Experimental Digital Code Use In Bands Above 50 MHz

The Commission authorized use of new and experimental digital codes in the Amateur Radio Services at frequencies above 50 MHz. The Commission authorized use of any digital code representing alphanumeric characters, analogue measurements, or other information. As with the codes specified in the rules, it authorized but did not limit uses to radio teleprinter, voice, facsimile, television, communications to control Amateur Radio stations, models or other objects, transference of computer programs and direct computer-to-computer communications, and communications in various types of data networks, including "packet switching" systems.

The FCC specified that use of all codes must be to facilitate rather than to obscure the exchange of communications, and coded operations must be carried on in accordance with other applicable rules. It retained

the prohibition against the use of unspecified digital codes on 50.0-50.1 and 144.0-144.1 MHz, frequencies designated for A1 emissions (Morse code) only, and frequencies below 50 MHz.

The Commission considered the fact that use of new and experimental codes would reduce not only its own ability but also the ability of Amateur operators to monitor coded transmissions to ensure operation within the rules. While that factor must be balanced against the objective of encouraging experimentation and new technology, the FCC said, special provisions included in the rule change, plus the Amateur community's conscientious efforts to protect its allocated bands, should provide adequate protection against unauthorized operations.

The rules continue to require open identification in plain English or Morse code. The rule change provides that a description of the digital code and modulation technique used must be entered in the station log and provided to FCC personnel on request. It also provides for ordering immediate cessation of such use by a station suspected of unlawful misuse.

The FCC began the rulemaking October 1, 1981, proposing to permit Amateur use of codes other than those already authorized, in response to a request by the American Radio Relay League. Previously, the rules authorized only the International Telegraphic Alphabet Number 2 (Baudot code) and the American Standard Code for Information Interchange (ASCII code).

Cable TV Firms To Be Fined For Unauthorized CARS Station Operation

The FCC directed its Cable Television Bureau to issue notices of apparent liability for forfeiture of \$14,000 to Karnack Corporation (Winter Garden Cable TV) and its subsidiary, Cable Television, of Eagle Pass, Inc. (Rio Grande TV Cable), for unauthorized construction and operation of cable TV transmit and receive facilities.

Last January 5, Winter Garden, licensee of Cable Television Relay Service (CARS) stations KYX-61, Pearsall, and KYX-62, Loma Vista, TX, applied for construction permits to alter one or both stations, including increasing transmitting antenna height and relocating receive antenna and building receive sites at Big Wells, La Pryor, and Batesville, TX; and to construct a new CARS station at Moore, TX. Rio Grande proposed three new CARS stations at Eagle Pass, Farias Ranch, and Winter Haven, TX.

On the same date, the applicants' counsel informed the Commission by letter that the proposed changes had already been made to CARS stations KYX-61 and 62 and the new stations were built and operation begun without FCC approval. Counsel said the applicants mistakenly believed they had complied with the Commission's licensing requirements. (The unauthorized construction apparently occurred between October 1979 and November 1981).

The Commission said granting the applications would serve the public interest because it would result in a single interconnecting CARS microwave network between Moore and Quemado, TX.

However, it imposed a \$14,000 fine because the applicants built an extensive CARS microwave system without authorization, citing the length of the violation, its multiple nature, and the possible threat to air safety caused by the applicants' failure to obtain Federal Aviation Administration clearance before constructing their radio towers. Because of the one year statute of limitations in the Communications Act, this forfeiture only applies to violations committed within one year of the release date of this order, the Commission said.

The Cable Bureau will issue forfeiture notices of \$2,000 and \$3,000 to Winter Garden for unauthorized changes at KYX-61 and 62 and for unauthorized operation of a CARS station at Moore; and notices of \$3,000 per station (\$9,000 total) to Rio Grande for unauthorized operation of CARS stations at Eagle Pass, Farias Ranch, and Winter Haven.

Rules Relaxed On Electronic Games

The Commission relaxed certain computing device rules adopted in 1979 as they apply to consumer, home-operated, and commercial coin-operated electronic games, permitting both to follow a less burdensome compliance procedure and applying a less stringent radio frequency emission standard to coin-operated games.

The FCC made both home and coin-operated games generally subject to its verification procedure, under which manufacturers are required to test their own devices to determine their compliance with FCC rules. Previously, many home-operated games have been subject to certification procedure, and all coin-operated games have been potentially subject to the certification requirement. Certification requires submission of a formal application, test results, and related documentation to the FCC for a compliance determination before marketing.

The Commission also made coin-operated games subject to emission standards designed to control the interference potential of digital electronic computing devices used in a commercial environment. Those games were subject to emission limits governing devices marketed for use in a residential environment, which are three times more restrictive because of the potential for interference to radio and television communications in a residential situation.

Consumer games for home operation remain subject to the stricter limits. Games using a television receiver for display are not affected by the rule changes and remain subject to FCC type approval procedure, which requires submission of models for testing by the FCC before marketing. Reduction of that requirement to certification has been proposed in another rulemaking, begun in 1979 (Gen Docket No. 79-244).

Verification is mandatory for coin-operated games manufactured after December 1, 1982. The compliance date for home-operated games will be October 1, 1983.

After receipt of a petition by the Toy Manufacturers of America, Inc., the Commission in 1981 amended the computing device rules, exempting from certification self-contained home-operated games that do not use a TV screen for display and employ a "clock frequency" below 495 kHz. The clock frequency is the controlling rate of digital pulses employed throughout the game circuitry. Higher clock frequencies provide for more complex games.

Texas Instruments, Inc., then petitioned for reconsideration, asking for a clock frequency threshold of 1.5 MHz and a delay in the certification deadline.

The Commission found that neither clock frequency nor any other simple set of technical characteristics could totally determine potential for interference.

The trend of the technology used in electronic games is toward higher clock frequencies and lower power, resulting in lower levels of emissions but at higher frequencies. Use of a clock frequency threshold for certification would require periodic reexamination and revision as the technology changes, the FCC said. As a result, it eliminated the clock frequency threshold entirely.

On the basis of the responsible compliance record demonstrated by manufacturers of home games, certification is not war-

ranted. Verification will provide an adequate safeguard against interference. The technical emission requirements remain unchanged. No further action will be required for devices already certificated or verified.

The Commission, responding to petitions by Williams Electronics, Inc., and Atari, Inc., proposed in 1981 to amend the rules for coin-operated games to require verification and the lower emission standards. It stayed the compliance date of the rules for coin-operated games until completion of the rulemaking.

In adopting the rule change for coin-operated games, the FCC said reports of interference caused by games reaffirm its earlier conclusion that emission control standards are needed. But the technical information available, it said, suggests that the limits established for commercial area operation will be adequate.

To ensure that those limits are sufficient and that manufacturers verify the compliance of their games, the Commission said it will monitor the situation closely and spot-check sample games for compliance. If the lower limits prove inadequate to protect communications, a new rulemaking will be initiated. The FCC declined to permit general operation of games at the user's site for determining customer acceptability before verification of compliance.

FCC Releases Interim Report On Future Private Land Mobile Requirements

The FCC's Private Radio Bureau announced today the availability of its *Interim Report on Future Private Land Mobile Telecommunications Requirements*.

The study was prepared by the Private Radio Bureau's Planning Staff to provide a set of preliminary projections of future private land mobile telecommunications requirements, through the end of the century. This report is part of a larger study, initiated by the Private Radio Bureau in PR Docket 82-10, to provide information for developing a strategy to meet future private land mo-

bile telecommunications requirements. It consolidates the available information regarding future private land mobile telecommunications requirements, including comments submitted in PR Docket 82-10, as well as information regarding possible alternative means for meeting the requirements. It is expected that the land mobile community and other interested parties will review this interim report, and participate in a cooperative effort to expand upon and refine the information contained in the report. Comments received will be used in preparing a final report on future private land mobile telecommunications requirements to be released in 1983.

The report may be reviewed at the FCC Library, Room 639, 1919 M Street, N.W., Washington, D.C. 20554, and a limited number of copies are available at the FCC Office of Public Affairs, Room 207, 1919 M Street, N.W., Washington, D.C. 20554, (202) 254-7674. Copies may be purchased from the Downtown Copy Center, 1114 21st Street, N.W., Washington, D.C. 20037, (202) 452-1422, as well as thirteen FCC authorized distributors (a list of the distributors may be obtained from the Office of Public Affairs).

For information concerning the contents of this report contact Mr. Art Radice or Ms. Rose Crellin, Planning Staff, Private Radio Bureau, Federal Communications Commission, Room 5002, 2025 M Street, N.W. Washington, D.C. 20554, (202) 254-3301.

Frequencies For Wildlife Tracking In The Forestry-Conservation Radio Service

The FCC proposed authorizing frequencies in the Forestry-Conservation Radio Service for wildlife tracking telemetry.

The State of Oregon, in seeking amendment of Section 90.25 of the rules, indicated that it has used radio in connection with size, density, distribution, and vital statistics studies of animal populations since 1971 when it was issued an authorization for 22 frequencies in the Forestry-Conservation Radio Service for its animal tracking program. In 1973, this authorization was modified to increase the number of units as well as input power and was renewed for five years.

In 1978, the FCC required that the licensing be changed from the Forestry-Conservation Radio Service to the Experimental Radio Service, a service in which authorizations must be renewed every two years.

The State indicated that the change to the Experimental Radio Service affected only the paperwork involved since the frequencies and equipment had not changed at all. It said that going through an exercise every two years of renewing an experimental license only produced unnecessary costs.

Therefore, it requested that it be allowed to use their frequencies under a Forestry-Conservation authorization so that renewals would be made every five years instead of every two.

The Commission said animal tracking did

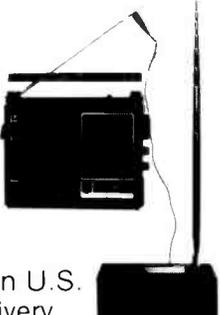
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appear to be an ongoing, permanent program, rather than an experimental activity and, therefore, it was proposing permitting the use of low power telemetry in the Forestry-Conservation Radio Service in connection with wildlife tracking and official forestry conservation activities on a secondary basis, providing that such use shall not cause harmful interference to other licensees in that service.

Exemption From Distress Watch Proposed; VHF Channel 88A For Lake Michigan Commercial Intership Communications

The Commission has proposed to exempt limited coast stations from the FCC rule requirement to maintain watch on the distress, safety, and calling frequency 156.8 MHz in the VHF maritime mobile service in areas where the Coast Guard or other government agencies maintain a thorough watch on the frequency.

The Commission also proposed to make simplex VHF marine channel 88A available for commercial intership communications in the Lake Michigan area more than 75 miles from the U.S./Canadian border.

A general exemption from the watch requirement was proposed for limited coast stations covering areas of the Atlantic, Pacific, and Gulf coasts, since the Coast Guard maintains continuous watch on 156.8 MHz along the entire coastline. Case-by-case exemption was proposed for stations serving inland waters where it is shown that federal, state, or local stations maintain the watch.

The FCC has previously exempted public coast stations from the watch where the Coast Guard or another government entity maintains it. The frequency 156.8 MHz, in addition to its use for distress and safety messages, is used as a calling frequency to initiate contact between ships and coast stations. After contact is made, the parties shift to working frequencies.

Limited coast stations are maritime radio stations on land which serve the operational and business needs of ships but are not open to public correspondence, as public coast stations are. Present rules require all limited coast stations licensed to transmit by telephone in the 152-156 MHz band to maintain watch on 156.8 MHz during their hours of regular telephone service.

Simplex channel 88A (157.425 MHz) is used for commercial communication between ships in areas other than the Great Lakes and St. Lawrence Seaway. It is not available in the Great Lakes/St. Lawrence area because duplex channel 88 (157.425-162.025) is used by ships within 75 miles of the U.S./Canadian border for public correspondence with Canadian coast stations.

Lake Michigan is the only one of the Great Lakes located entirely within the United States. Except in the northern part within 75 miles of the border, the FCC said, there is no reason why channel 88A should not be used in Lake Michigan.

New Forms For Private Land Mobile And General Mobile Radio Services

The FCC amended its rules to substitute Forms 574, 574A, and 574B for Forms 400 and 400S for use by applicants for authorizations in the Private Land Mobile and General Mobile Radio Services.

The FCC said the new forms have been designed to reduce the information collection burden on the public while satisfying the essential International Telecommunication Union (ITU) and Canadian coordination reporting requirements. Information from the applications is used to protect existing stations and to resolve interference disputes between licensees in different countries.

In addition to substituting the application forms, the FCC said it was modifying system licensing procedures in two ways. First, it is expanding the number of stations that may be contained in a system license. Second, it is making the submission of system applications optional rather than mandatory.

Currently, only applications involving systems consisting of not more than two stations at permanent locations are submitted as applications for a system license. Those needing larger systems have had to file multiple applications. The FCC said this limitation was dictated by the capabilities of its data processing systems.

In addition, it said the mandatory filing requirement to file a system application when not more than two stations at a permanent location are involved has proved to be burdensome for both the Commission and the applicants. Therefore, in view of its enhanced computing capabilities, applications involving systems of not more than six stations at permanent locations may be filed as

applications for system licensing. The Commission also said it was eliminating any compulsion on applicants to seek a single system license.

Regarding new application forms, the Commission said Form 574, replacing Form 400, is to be used by those applying for new stations or systems, for modification of existing systems or for Commission consent to the assignment of a license. The new form, which deletes some questions contained on Form 400, will require applicants to state the effective radiated power of their proposed station. The Commission said in order to minimize the impact to the public in supplying this data, existing licensees may continue to use Form 405A (the short form) when filing for renewal. They will have to file Form 574 for station modifications.

Form 574A, replacing 400S, is to be filed by applicants for 800 MHz band stations. The FCC said this new form will enable it to collect in a more orderly fashion information already supplied by licensees in this band. Licensees are to use Form 574A when applying for a modification, for consent to an assignment or for a new station or system. Form 405A may be used by these licensees for simple renewals.

Form 574B will be used by stations operating below 27.5 MHz to fulfill ITU reporting requirements and facilitate U.S./Canada and U.S./Mexico coordination procedures. New data elements on this form include: class of operation, azimuth of main lobe, and angular width of radiation main lobe of directional antennas. The FCC added that because it is in the bands below 27.5 MHz that there is the greatest potential for international interference problems. No exception in filing requirements will be made for existing licensees.

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Scanning Georgia!

BY CLARENCE WILSON, KGA4FV

Here Are The Peach State's Police Communications Systems & Radio Codes

The Georgia State Patrol operates from various locations ("posts") around the state for base-to-base and base-to-mobile operations. The posts identify by individual numbers ranging from Post 1 to Post 47 and operate on the following channels:

Channel #	Bases	Mobiles
Low Band	42.02 MHz	42.02 MHz
1	154.68	154.80
2	none	154.68
3	154.905	154.935
4	none	154.905
5	154.935	none
M.R.D.	155.37	

Some units can also operate on 155.475 MHz. Frequency 42.18 MHz is used for Alcohol & Beverage Control operations. Post 35 operates on 45.94 MHz.

The Georgia Bureau of Investigation head-quarters in Atlanta has the callsign KLI329; however, it identifies as "2002" over the air. Vehicles bearing identifications between 4000 and 4999 are GBI units, and all vehicles using an ID beginning with a zero are GBI troop or post commanders. GBI units are dispatched over GSP channels 1 and 3; GBI mobiles communicate with one another on 154.815 and 155.505 MHz.

Here are the GSP Post numbers and callsigns:

Post 1	Griffin	KIB591
Post 2	La Grange	KIB589
Post 3	Cartersville	KIB587
Post 4	Villa Rica	KIB590
Post 5	Dalton	KIB602
Post 6	Gainesville	KIB436
Post 7	Toccoa	KIB600
Post 8	Madison	KIB599
Post 9	Marietta	WXK538
	Atlanta (GBI)	KLI329
Post 10	Americus	KIB592
Post 11	Hinesville	KIB596
Post 12	Thomasville	KIB605
Post 13	Tifton	KIB594
Post 14	Donalsonville	KIB593
Post 15	Perry	KIB598
Post 16	Helena	KIB612
Post 17	Washington	KIB674
Post 18	Riedsville	KIB673
Post 19	Swainsboro	KIB610
Post 20	Dublin	KIB609
Post 21	Sylvania	KIB597
Post 22	Waycross	KIB595
Post 23	Brunswick	KIB611
Post 24	Newman	KIB608
Post 25	Thomson	KIB607
Post 26	Thomaston	KBP885
Post 27	Blue Ridge	KIB588
Post 28	Canton	KBP645
Post 29	Cedartown	KIB603
Post 30	Cordele	KIB604
Post 31	Valdosta	KIB242



Post 32	Athens	KIB568	10-22	Give phone number where you can be reached
Post 33	Milledgeville	KS1979		
Post 34	Manchester	KIG575	10-23	Stand by
Post 35	Jekyll Island	KIR360	10-24	Records indicate stolen
Post 36	Douglas	KDV659	10-25	Pedestrian check
Post 37	Lawrenceville	KFG428	10-26	Detaining subject
Post 38	Rome	KBP644	10-27	Driver license info
Post 39	Cuthbert	KGL537	10-28	Vehicle registration data
Post 40	Albany	KIB672	10-29	Check for wanted
Post 41	Lafayette	KIB836	10-30	Improper use of radio
Post 42	Savannah	KL6599	10-31	Crime in progress
Post 43	Calhoun	KRL340	10-32	Person with weapon
Post 44	Forsyth	KRP683	10-33	Chase in progress
Post 45	Statesboro	KRZ241	10-34	General alert
Post 46	Conyers	WXP675	10-36	Correct time
Post 47	Forest Park	WXB837	10-37	Dispatcher on duty

Radio Codes Used By GSP

10-1	Unable to copy	10-39	Investigate suspicious vehicle
10-2	Receiving well	10-40	Permission to leave area
10-3	Proceed	10-41	Prowler
10-4	Message acknowledged	10-42	Dog case
10-5	Relay	10-43	Intoxicated pedestrian
10-6	Stand by unless urgent	10-44	Possible mental case
10-7	Out of service	10-45	Domestic problem
10-8	In service	10-46	Prisoner in custody
10-9	Repeat message	10-47	Medical Examiner needed
10-10	Out of service at _____	10-48	Unattended death
10-11	Speak more slowly	10-49	Possible homicide
10-12	Stand by at present location	10-50	Cruiser involved in accident
10-13	Weather/road conditions	10-51	Debris in road
10-14	Escort duty	10-52	Improperly parked vehicle
10-15	Have subject in vehicle	10-53	Possible OUI
10-17	Meet complainant at _____	10-54	Drag racing
10-18	Complete assignment ASAP	10-55	Auto accident
10-19	Return to _____	10-56	Wrecker required
10-20	Location is _____	10-57	Ambulance required
10-21	Call by telephone	10-58	Direct traffic
		10-59	Assist motorist
		10-60	Assist hunter (lost)

- 10-61 Hunting accident
- 10-62 Drowning
- 10-63 Night hunting
- 10-64 Dog/deer complaint
- 10-65 Boating accident
- 10-66 Snowmobile accident
- 10-67 Noise complaint
- 10-70 Civil disturbance
- 10-71 Bomb threat
- 10-72 Fire alarm
- 10-73 Trouble at station
- 10-74 Emergency: Help officer
- 10-75 Emergency: Radio silence
- 10-76 Jail break
- 10-77 Road block
- 10-78 Bank alarm
- 10-79 Plane crash
- 10-80 Home/business alarm
- 10-81 Report of smoke
- 10-82 Persons fighting
- 10-83 Traffic violation
- 10-85 Arriving late
- 10-89 Make transmissions shorter
- 10-90 Unable to say over radio
- 10-91 Call home; no emergency
- 10-92 Out of service/On assignment
- 10-93 Open garage door
- 10-94 Close garage door
- CODE 7 Office at home
- SIGNAL 1000 Observe radio silence unless emergency

Readers are invited to furnish radio codes, signals, and other relevant communications data for state agencies, and also for agencies in major cities and larger counties.

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May We Recommend

The American SWL Club, 16182 Ballad Lane, Huntington Beach, CA 92649. This club has been operating since 1959. It publishes an excellent 60 page monthly DX publication covering shortwave and broadcast band DX, utility stations, QSL reports, and more. The club co-sponsors three annual DX meetings per year held in southern California. Dues in North America are \$16 per year (includes First Class Mailing of monthly publication). Students (located in North America and 16 years old or younger) can join for \$13 per year. A sample bulletin is available from the club for \$1 (in North America).



SPEEDX, P.O. Box E, Lake Elsinore, CA 92330. This group offers several grades of membership based upon the amount of participation in the organization's publication which, coincidentally, is called *SPEEDX!* The publication runs 60 pages per month and is chock full of news and information, frequency listings, skeds, and other information on shortwave stations, including utilities. The publication even includes a technical section. The group also offers a number of excellent reference publications and DX'ing aids. Annual membership in North America is \$16 (includes First Class Mailing of publication). A sample copy of *SPEEDX* is available from the group at \$1 (to anywhere in North America).



The Longwave Club of America, 45 Wildflower Rd., Levittown, PA 19057. Here's a club for those rugged enthusiasts interested in knowing what's happening below 540 kHz! Their monthly publication, *The Lowdown*, not only covers listings of stations operating between 10 and 540 kHz, but also has interesting coverage of the 1750 Meter (no license) low power communications band as conducted by Ken Cornell (W2IMB—well known "Lowfer" authority). Membership includes mailing of the publication by First Class Mail and costs \$10 per year (anywhere in the world).



CRB Research, P.O. Box 56, Commack, NY 11725. CRB's Monitor Station Registration program provides scanner owners with their own personally assigned identification letters (similar to a callsign) which are now widely used by monitoring enthusiasts when writing to manufacturers, publications, public safety agencies, other communications users, etc. This program has been in operation since 1974 and has registered many thousands of enthusiasts. An attractive certificate is issued to all registrants showing their assigned registration letters, name, and the date—and embossed with a seal pressed into the certificate. This is \$5 (anywhere in the world).

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

We Liked These Books

(So Will You!)

Well, how'd Santa treat ya? Y' say Aunt Rachel gave you a pair of magenta spats; Mom baked some of her famous spice cake and dropped the whole thing in the snow on the way to your house; and the Little Woman gave you the news that Junior is going to need braces on his teeth.

Okay, so you didn't get your dream receiver, and nobody gave you that RTTY terminal. Maybe next year. In the meantime you can don your new spats, take a slice of mushy spice cake, and ride out the remainder of this beastly winter by increasing your information input—programming more bits into the ol' memory chip.

Here are some newly published books which should fill the bill very handily. Maybe you owe yourself a present. Why not?

Antenna Theory— Analysis and Design

**By Constantine A. Balanis
Harper & Row**

Although this book is meant to be used as a college textbook for electrical engineering students, it has a very good mixture of both theoretical and practical material. While analytically detailed and very thorough, *Antenna Theory* is easy to follow and use, and it is ideal for self-study. The book begins with basic material, develops the underlying concepts needed for sequential topics, and then progresses to more advanced methods and systems configurations. Each chapter is divided into sections or subsections the individual headings of which clearly identify the antenna characteristic discussed. Also, the book is full of examples, design data, references, and assigned problems. FORTRAN computer programs are also printed at the end of many of the chapters.

Of interest to the radio amateur are many three-dimensional computer-generated graphic illustrations for a clearer view of radiated fields and to better understand the underlying principles of radiation. Also, matching techniques such as the binomial, Tschebyscheff, "T," gamma, and omega match are described and analyzed. Design procedures (along with examples) are outlined for each type of matching system.

Log-periodic dipole arrays and Yagi-Uda arrays are described and analyzed in detail. Complete design procedures are outlined for both of these types of antennas. Information from many sources is included, such as Peter P. Viezbicke's "Yagi Antenna Design," NBS Technical Note 688.

Microwave antennas are covered in great detail. These include antennas such as rectangular and circular apertures; microstrip antennas; various types of horn antennas;

plane, corner, parabolic, spherical reflector antennas; and lens antennas. The book also contains a detailed chapter on antenna measurements, including information on antenna ranges. At the back of the book is a set of appendices. These include tables of Cosine and Sine integrals, Fresnel integrals, Bessel Functions, and other identities and functions.

Antenna Theory can be obtained from Harper and Row, M. Gonsky, Suite 5D, 10 E. 53rd Street, New York, NY 10022. The book is 790 pp. Price is \$39.50 plus postage and handling

Roger A. Cox, WBØDGF

Radio Handbook, 22nd ed.

**By Bill Orr, W6SAI
Howard W. Sams and Co.**

The impression one gets from a price of \$39.95 is that even in these days of inflation that cost should entitle you to a veritable encyclopedia. Fortunately, that is exactly what you get. One thing this well-known author cannot be accused of is a lack of completeness. Since this is the 22nd edition, there has been sufficient time to work on the selection of contents, and while you might be a bit disappointed at the depth of certain sections, the material is there, although you might have to work a little to find it.

Chapters 1 through 6 introduce amateur radio and basic electronic concepts. There is just enough in each section to answer the most commonly asked questions as well as to prepare the reader to go on to a more advanced book if further depth is needed. Unfortunately, the mix of old and new in these chapters is confusing. Selection of a 2N168 for a circuit example should have been updated to a newer and more obtainable transistor, and similar comments can be made on spending space on RTL as a logic system.

A highlight of the book begins in Chapter 7, which describes r.f. power amplifiers. This material in combination with 136 pages in Chapter 21 is probably one of the most complete reference works on power amplifiers and design examples available and will very likely save the home brewer or ham repair person many hours of looking for material in back issues of magazines or manufacturer's literature.

There is again a mixed blessing in terms of material selection. The venerable and much beloved 813 is used for a very complete design example in place of a more modern tube. However, the portions devoted to solid-state amplifiers make up for this deficiency, although you have to hunt for the v.h.f. solid-state power amplifier material under "Mobile and Portable" in Chapter 19.

Special processing circuits, synthesizers,

and receivers are well treated. A clear and readable section on the mysteries of dynamic range, intercept point, *et al*, is one of the better parts of the book. Solid-state power supplies are also well treated, but one could question why so much space was devoted to mobile power supplies for tube-type finals, since this reflects the state of amateur radio in the 1960s and 70s, not the 80s.

The sections on radiation, propagation, and antennas are again brief but good. Occasional editing difficulties, such as placing a figure two pages away from the corresponding text (Chapter 31), should not discourage you from considering this book.

The phrase "brief but good" applies to most of the book. You will probably want more information on any single topic you might be interested in, but perhaps to supply that in one book the price would have to go from \$39.95 to a much higher figure, which might place this encyclopedic work out of the reach of many amateurs.

The *Radio Handbook* is available from POP'COMM Book Shop. The price is \$39.95 plus \$2.00 shipping and handling.

Paul M. Danzer, N111

Android Design

**By Martin Bradley Weinstein
Hayden Books**

Marty reaches deep into his bag of technical and engineering tricks in *Android Design*. This is not a Heathkit-style project or a follow-these-plans book. It's a book about how to design things that involve electronics, mechanics, and people. The chapters on batteries and heat sinks alone justify its inclusion on any amateur's bookshelf. However, his bag of tricks runs deeper than that.

Imagine a slow scan camera based on a \$20 circuit! The imaging device is a common dynamic RAM memory. Marty calls it a "ramera," described in a chapter that discusses android vision.

When's the last time you tried to motorize anything, be it a tower crank, antenna rotator, moonbounce elevator, or whatever? Marty's chapters on motors and motor drives take the mystery out of these projects.

We should also mention that scores of suppliers—both manufacturers and surplus houses and dealers—are listed along with each topic.

For handicapped hams, the discussion of collision avoidance discusses many ways to put electronics to work inexpensively to locate obstacles. Infrared light and ultrasonics are just two of the topics covered, with circuit descriptions.

This is much more a how-to-design than a how-to-build book. And you don't have to be planning to have a mechanical man run-

ning around to get a lot out of it. As is the author's style, the text is easy-reading and filled with MBW-isms and anecdotes.

It's available for \$11.95 at many bookstores, including Waldenbooks. If not immediately available, it can be ordered through the store (Hayden #5192-1) or directly from Hayden Publishing (50 Essex Street, Rochelle Park, NJ 07662).

Getting Publicity

By Martin Bradley Winston
John Wiley & Sons

This is probably one of the best books of its kind anywhere. As much as it's simply written—even a raw beginner could get results by following the book's advice—it includes insights and tricks of the trade that are of value even to seasoned professionals. For your club or business, it's hard to imagine not getting a lot out of *Getting Publicity*.

Marty explains what publicity is—and isn't—and the kind of news coverage (and other things) that can result from it. He gives an accurate and insightful description of what editors and other people at the "far" end of the publicity channel are like. He describes everything you need to have or get or do in order to produce publicity. And he tells how to get it done.

Everything's covered from writing and photography to printing and mailing. Marty even starts earlier with important advice on planning and researching (which is easier to do, thanks to his tips, than it sounds) and later goes on to tracking results and following up.

The book is full of examples and exercises. You'll see how professionals like Radio Shack, Sears Roebuck, and Motorola send out materials.

This is must reading for everybody who owns or runs a business, big or small, and for people who want to do a better job of getting club activities into the news.

Getting Publicity (ISBN 0471-08225-2) is available at most book stores for \$8.50, or write to John Wiley & Sons, 605 Third Avenue, New York, NY 10158.

Alan M. Dorhoffer, K2EEK

HF Antennas for All Locations

BY L.A. Moxon, G6XN
RSGB

So, you want to put up a vertical antenna, but there's no place for a decent set of radials? Or the rental store called the XYL the day before she left to visit her mother to ask when you wanted the chain saw delivered? You say your recently departed uncle left you six B-I-G ones, and you can't decide whether to buy the Okefenokee Swamp or Pike's Peak for your dream antenna farm? Or the kid down the block ate your lunch all over 15 meters in the recent DX contest? And he was running barefoot? Is that what's troubling you, Bunkie? Well, cheer up, fellow; help is on the way from our British

cousins at the RSGB in the form of a new book, *HF Antennas for All Locations* by Les Moxon, G6XN. This book celebrates the art of the possible in high-frequency antennas, and is sure to find an important place on the bookshelf of any amateur interested in high-frequency operating.

This is an eminently practical book designed to help optimize your signal on the high-frequency amateur bands, especially where money, XYL's, neighbors, or zoning ordinances are real considerations and limitations. It is written from a European perspective—tiny lots, heavily urbanized areas, and variances required for anything more substantial than a TV antenna.

Yet, clearly, the author, like any good amateur, can dream, because time is spent carefully analyzing the characteristics of the ideal QTH. Consideration is given to subjects such as angle of radiation, ideal antennas for the ideal QTH, grounding, etc. The author has proven many of his theories with practical work as well, using QRP rigs backpacked to ideal locations to give them a try. Instead of the usual "I got a 5 x 7 running my 8877 wide open," Mr. Moxon regales us with tales of long-path QSO's into Australia from England via the Long Path, running 1 or 2 watts into temporary antennas.

The book is full of practical antennas, many common on our side, but also some hardly known at all. And they are considered in real terms—in the environment that they are likely to be erected in. For example,

how do trees affect your signal, wet or dry? The answers are here, and even advice on optimizing your signals in trees. There is excellent coverage of invisible antennas, mini-antennas, apartment antennas, and a variety of wire antennas. Phased arrays, such as 8JK's and phased verticals, are covered.

The book reflects a somewhat different tradition in antenna design from contemporary American publications. Yagis are rather lightly treated, probably because the author feels that they are adequately covered elsewhere. Some of the material will definitely be considered controversial. For example, traps get short shrift in favor of linear decoupling techniques, including use in wire antennas. More shots are fired in the Quad vs. Yagi wars. Antennas virtually unknown in the States are offered for consideration in situations where we would favor a Yagi.

Parts of the book get somewhat technical, but in most cases where this occurs, Mr. Moxon recognizes that not every one is into heavy math, and he offers conclusions in a simplified, readable way.

If you are a "Pair of matched 8 element Yagis on 67 foot booms, stacked, with half-wave phasing, on a rotating 140 foot tower" person, then this book is not for you. But if that description does not fit you, and you operate the high-frequency amateur bands, then this is an important book for you.

HF Antennas for All Locations is available from the ARRL at a cost of \$12.00.

Bob Locher, W9KNI

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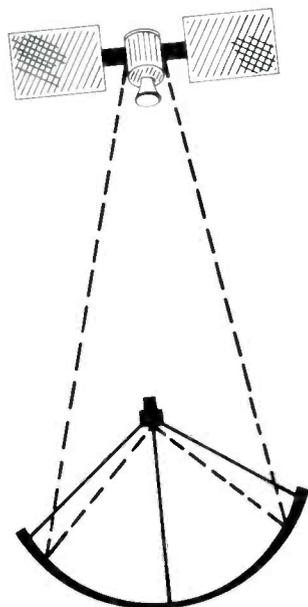
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LETTERS TO THE EDITOR

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

A Hot Receiver

I've followed the excellent information POP'COMM has provided regarding grounding my antenna supporting tower, and have been further inspired to commence grounding everything else around my station which seems to require grounding. When I connect my communications receiver to a cold water pipe, a nifty spark occurs. I find about 14 volts AC between the radio chassis and ground. Does this indicate something wrong with my house wiring, with my receiver, or with the way I am attempting to ground the receiver?

B. J. Longstreet, Jr.
Santa Fe, NM

This isn't all that uncommon a phenomenon. It merely indicates AC leakage from one of the high voltage windings from the receiver's transformer to the case, hence to the chassis. I assume that your receiver is an older one which does not have a 3-prong grounded power plug, so your best bet is to reverse the AC plug in the wall outlet. If that eliminates the situation, then the source of leaking voltage is in the primary winding of the transformer. If that's the case, just be sure that the plug is always inserted to reduce the potential between chassis and ground zero. It's worthwhile to mark the plug so that it will always be inserted in the receptacle in the same direction. It doesn't represent a hazard as long as proper polarity is observed. — Editor.

New DX Nations

Your great story on new DX countries (October issue) missed one. The Principality of Castellania is on an island in the Pacific. It was founded in 1974 and it now has postage stamps, press credentials, university degrees, and many other things going for it. Citizenship, including a valid Castellanian passport, is available for about \$145. The address of the Castellanian Commercial Representative in the U.S. is P.O. Box 40201, Pasadena, CA 91104, for those wishing more information on citizenship.

Burt McCauley
Los Angeles, CA

Here's a new nation that should have been included in your October story—the Conch Republic, located in former Key West, FL. Last April, the U.S. Border Patrol sealed off the Overseas Highway (U.S. Rt. 1) in order to search for smuggled drugs and



illegal aliens. It caused a 19 mile traffic jam and inconvenienced scores of local residents and vacationers, causing a serious threat to the economic structure of Key West. The citizens of Key West decided that if federal authorities could erect a barricade across the only road leading into Key West, then the residents could declare themselves an independent nation. Upon this announcement, on April 23rd, the secessionists raised the Conch Flag. A silver commemorative medal to mark this event was struck by Republic Mint & Refining Inc., of Ft. Lauderdale (I am enclosing one as a gift). The medal shows the legend CONCH REPUBLIC and the date April 23, 1982, on the front. The reverse shows our flag flying over an outline of Key West and the word "Liberty." Please mention this in POP'COMM.

George Tregaskis
Key West, Conch Republic

Calling Ohio Scanner Owners!

In the September issue's photo section, you had a view of the radio shack of Jerry Callam in Ohio. You should have pointed out that Jerry is the President of the All Ohio Scanner Club, a fine organization with about 300 members throughout the state. They publish a newsletter and invite memberships from all scanner enthusiasts in and around Ohio. Keep up the good work with POP'COMM!

R. H. Hunnicut
Cincinnati, OH

We agree that the AOSC newsletter is a fine one and Jerry has done an excellent job with this club. Jerry has advised me that he'll send a sample of the AOSC newsletter for \$1—and that \$1 is deductible from the club's membership fee for those who join the group. For more info, write to Jerry Callam, All Ohio Scanner Club, 10 Avalon Road, Mt. Vernon, OH 43050. If you just want info on the AOSC without the sample newslet-

ter, send Jerry a self addressed stamped envelope. Be sure to tell him that POP'COMM sent you! — Editor

A Dose Of Our Own Medicine?

Your December story on the use of radio broadcasting as a means of disseminating propaganda was so informative and exciting that I'm enclosing my subscription for POP'COMM. I would, however, have preferred that you rode Castro's case a lot more since he is most definitely opening up a new and most disgusting era in propaganda broadcasting. I'm referring to his "test" late last August wherein he broadcast to the United States in English over five frequencies causing deliberate disruption to American broadcasters on those frequencies. This was a new low and should be condemned as the last act of a desperate hooligan.

J. Lawrence Crocker
Des Moines, IA

It may well have been a low in broadcasting, but it wasn't a very new one. I don't know how to break this news to you, Larry, but Fidel learned this trick from our own government and was merely reminding us how we did it to him 20 years earlier. During the Cuban Missile Crisis of 1962, the Voice of America was programmed in Spanish and sent out daily broadcasts for three weeks (11 hours per day) over no less than eight American AM broadcast stations. Some of these stations were WMIE in Miami, KAAY in Little Rock, and WCKY in Cincinnati. This effectively captured the Cuban listening audience and I would imagine caused Fidel to take notes on how to do it. I should point out, for the record, that the Voice of America blanches at the word "propaganda" used to describe its operations, but whatever you want to call it, it was the VOA who kicked off the ball. If we get it back, it may be that we asked for it! However, I agree with you that it is a scuzzy stunt, at best. We were wrong to try it in 1962, as was Fidel in 1982. — Editor

Here's Help!

I've received (and verified) Air Force 1 and Air Force 2 (SAM-86970), and yesterday noted AF-2 on 13.200 MHz (LSB). I'd very much like to hear from other POP'COMM readers interested in military communications. I've got lots of station addresses, frequencies, and general info. Perhaps I can help readers out with missing information on these stations. Any readers wishing replies, please include a self-addressed stamped envelope.

Tim Taylor
P.O. Box 1213
Birmingham, MI 48012

Medic Monitoring

Last September, I attended the huge "Us Festival" held in Devore, California, bringing along my hand-held scanner to aid in my ability to keep track of what was going on behind the scenes. In much evidence at that concert was a busy medical team called Event Medical Services (EMS), which had its EMT's handling the first aid chores. I noticed that these people all had two-way communications via hand-held transceivers. One of their personnel told me that they cover many of the major public events in California and that he'd get me a list of their frequencies. Problem was that I could never again locate him in the milling crowd of 230,000. Can you advise the frequencies used by Event Medical Services?

Lewis Martin, KCA6KL
Tustin, CA

This busy company operates on the following frequencies at various events they cover: 151.625, 151.955, 154.54, 154.60, 155.205, and 155.34 MHz. — Editor

Both Sides Now

Several years ago there were announcements that AM Stereo broadcasting had been developed. Since that time, nothing has ever developed in this technology. Is this idea a dead duck?

Arthur Boshore
Reno, NV

Two systems were developed—the so-called Harris and the Leonard Kahn approaches to the technique. At the present time, there are about seven stations broadcasting in the Harris system (WQXI in Atlanta was the first), and another small group is now broadcasting stereo in the Kahn system (one of the first was KTSA in San Antonio).

Two factors have thus far prevented AM Stereo from becoming as popular as one might expect. One factor is that broadcasters are afraid to invest about \$50,000 to convert their stations to one of these systems for fear that the other system will catch on with the public and they'll have to spend another \$15,000 to convert to the other system. That leads to the second problem, nobody is manufacturing AM Stereo receivers and therefore none of the stations now using either system can be heard in stereo! Manufacturers are waiting to see which system will catch on, too—a bizarre Catch 22 situation a long way from a solution.

Unlike color TV, where the FCC decided which system should be used by broadcasters, this time around the FCC decided to let the public make the choice. Thus, the strange impasse with everybody afraid to make the big jump into either system. Existing AM Stereo broadcasters are attempting to get the ball rolling by generating interest in the concept in the hope that one system or the other will finally grab hold—hopefully the one in which they are broadcasting. — Editor

Vietnam Battle Communications

Just out of curiosity, and because I've never read anything about it anywhere, I'd like to know if American scanner owners were able to monitor any of the battle communications taking place on the low band during the war in Viet Nam. If so, what were they like?

Ron Thurgood
Topeka, KA

The war in Vietnam went from 1964 to 1975 and the scanner didn't get itself invented until 1968, although tunable VHF receivers were available long before then. While many listeners were able to monitor HF communications coming from the war zone, surprisingly few reported hearing anything skipping through above 30 MHz, although there was a sunspot peak right in the middle of the war years (1968).

Several tapes of Vietnam battle communications are being offered and if you're interested in hearing what was taking place on the frequencies there during those years you might check them out. The two sources I know of for these tapes are Bien Hoa Productions, Box 56, Fayetteville, AR 72702, and RJR, Rt. 3 Box 2538, Magnolia, TX 77355. Check with them directly on prices and availability—I've heard some of those tapes and they're absolutely harrowing. — Editor

Eye In The Sky

In the October issue of POP'COMM, you offered a listing of the artificial satellites transmitting weather and geological data. Would you please discuss some of the satellites that were not in that listing, such as the mysterious ones used for military and espionage purposes. Weather maps are "nice," but it's the other satellites that are the most intriguing and are omitted from NASA's satellite lists.

W. S. Lonagan
Denver, CO

Almost three quarters of our military communications are carried via satellites that are in geostationary orbit over the equator. Some communications are fed through commercial "birds," while others use special military satellites in high orbits that are beyond the range of terrestrial anti-satellite weapons in the Soviet arsenal. Five FLTSATCOM birds (all of which are in NASA's lists) provide the USN and USAF with communications. Six birds of the Defense Satellite Communications System connect the Pentagon and White House with primary military headquarters around the globe. Three NATO III satellites connect NATO forces in the United States and abroad. The USAF's AFSATCOM satellites are established to link strategic commands in the event of a nuclear conflict.

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nuclear detonations on earth while three Defense Support Program satellites can pick up nuclear blasts and also the heat they generate. The basic surveillance satellite is the KH-11 type, which is put into polar orbit for up to two years of service in order to transmit high resolution TV pictures. Should especially high resolution be required, two other types can be pressed into service. One is the "Big Bird" satellite, which returns six film cassettes to earth. The other is a low altitude surveillance platform carrying a single film cassette. These photos can focus on objects as small as a shoe and can count the number of troops in a field and identify various types of radar in use on the ground.

A souped-up version of the KH-11 satellite is called the DRM-4 (Dept. of Defense Reference Mission 4) type, which is scheduled for orbit in late 1985 from the Space Transportation System facilities at Vandenberg AFB in California. These satellites offer high resolution TV transmissions, which can be brought back to earth for servicing and repair and then sent back into orbit.

Also unlisted in NASA's computer are military satellites with names such as Aquacade and Rhyolite. These tune in on earth-bound radar and communications signals. The old TRANSIT series navigation birds are being replaced by eighteen NAVSTAR satellites to provide improved service. These are able to provide high accuracy location coordinates of our own forces so that they

can have land forces and aim weapons exactly on target. Defense maps are also prepared by means of orbiting satellites.

Strategic satellites in varying stages of research include LOBS (Laser Orbital Battle Station), BMD (Ballistic Missile Defense), and ASAT (Anti-Satellite). Another concept, still in the "suggested" category, would be placing nuclear warheads in orbit (via MX missile) during potential crises. They could then be dropped on targets if required, or if the crisis passed, they could be collected by the Space Shuttle for return to the arsenal. — Editor

No-License Hobby Banding

I've been monitoring 49.86 MHz—the no license hobby band—for some time now and have enjoyed your several references to this frequency. I've had a few contacts across town and even local cordless telephones. Please give some more coverage to operations on this interesting band.

Doug Ferrell, KFL4CR
Tallahassee, FL

We hope to run additional information on 49.86 MHz operations as time goes on, for certainly it has lots of potential for enjoying low power legal DXing. During the recent sunspot peak, a number of 49 MHz hobbyists were able to work several states while

running CW on 49.86 MHz. Contacting cordless phones is a new wrinkle I hadn't even considered; but it has possibilities. In the meantime, other 49 MHz low power hobbyists may wish to contact Doug at P.O. Box 12862, Tallahassee, FL 32308, to set up some working skeds. — Editor

Loose Change

Bravo! The listing of Brink's armored car frequencies in the October POP'COMM was fantastic! I've long been monitoring the local Brink's frequency and now others can share with me the excitement of the activities on their channels. Last September, a Brink's truck in this area had one of its back doors pop open on the Hollywood Freeway and spill 28,000 quarters all over the road. Not only was the local Brink's frequency buzzing but so were the area Highway Maintenance Service and Highway Patrol channels. A truly unforgettable experience for any scanner owners who were tuned in. It took more than two hours to clean up the "mess" using brooms and dustpans.

Sam Carrera
Los Angeles, CA

That's one I'm sorry I missed—sounds like a ball. Wonder if the Brink's drivers told their friends that they "picked up a little loose change" on the job that day. — Editor

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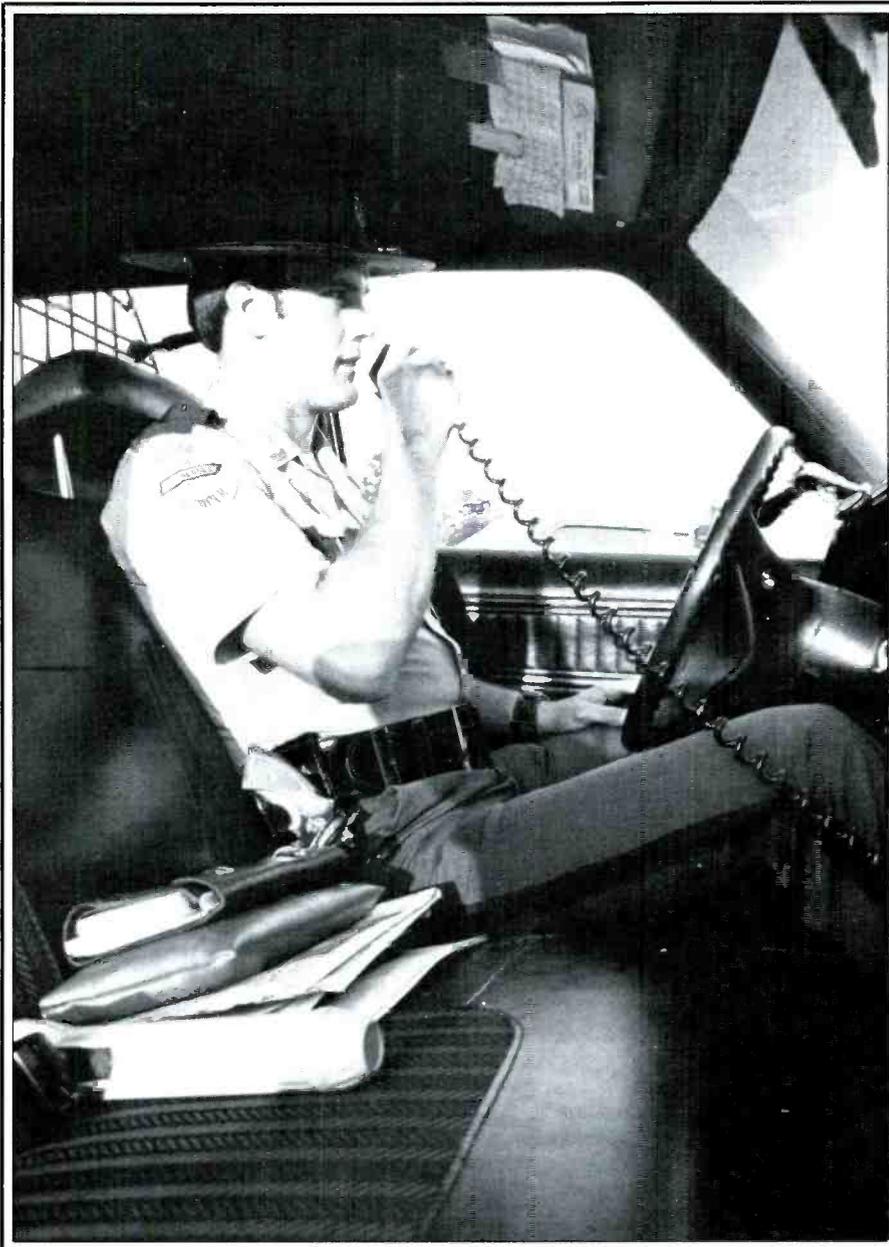
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RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE



In Georgia, Smokey Can Drive Like Bandit

Now, speeding through Georgia en route to Florida will be shadowed by sneaky Smokeys in speedy little Trans Ams and high performance Mustangs. Weary of eating the dust of hot-rodding good old boys, inspired by the movie "Smokey and the Bandit," the Georgia State Patrol has bought three sleek, lightweight, gray and black Pontiac Trans Ams and three high-performance Mustangs.

"It used to be Smokey chasing the bandit, but now Smokey's driving the bandit's car," gloated patrol spokesman Bill Wilson. He

said troopers "have gotten sick" of movies portraying them as chronic losers in high-speed chases.

But that's just what they are, according to Lt. Bill Grant, who has been test driving one of the new Trans Ams on Atlanta's busy interstates. Georgia's troopers, Grant complained, are driving cars that are just too plain slow. "Every single day that goes by, we got somebody that outruns a trooper," he said. "It's just as common as anything."

"Obviously," Wilson said, "there is an element out there intent on doing nothing but running at a high speed and endangering the life of the motoring public. We have to be competitive."

Bill Scheffer Demonstrates Radar Shortcomings To CBC

Officials from the Canadian Broadcasting Company and Bill Scheffer, Vice President of the Independent Truckers Assn., recently produced an hour long segment on trucks, truckers, and police radar. Ron Squire, producer of the documentary, said that the show, entitled *The Journal*, is the 60 Minutes of Canadian Television and is one of the most costly shows in the Trans-Canadian network schedule.

A licensed radar technician and qualified radar instructor, Scheffer frequently does demonstrations around the nation for various police agencies and judges, as well as for truckers. Scheffer is mainly concerned with the motorist or trucker who is obeying the speed limit, and yet receives a speeding ticket erroneously, and subsequently might lose his drivers license and cannot work. In the case of an independent trucker who owns and operates his own truck, this might mean he simply can't make his payments and will not only lose his rig, but maybe his home and job as well; a traumatic experience.

CHP Wants To Use Radar Throughout The County

The California Highway Patrol, which for years has sought to use radar on freeways, says a six month radar experiment in Orinda has sharply reduced serious traffic accidents and speeding. Prompted by neighborhood complaints of speeders, the \$2,200 locally-paid-for project was launched on 12 narrow, two-lane roads.

The patrol recently reported that during the last six months of 1981, fatal and injury accidents on the roads decreased 40 percent compared to the same period in 1980. It said total traffic accidents declined 11 percent and speeding decreased an average of 36 percent. Officers participating in the project issued 2,611 verbal warnings and 1,445 citations to motorists.

"Another measure of success is the interest and enthusiasm for expanding radar enforcement into other parts of Contra Costa County," says the patrol.

The California Legislature has repeatedly rejected bills that would permit freeway radar patrols.

Dismissal Of Speeding Charge Prompts Judge's Resignation

Daniel C. Hoffman resigned as Vineland (NJ) Municipal Court Judge after a Vineland police officer questioned his dismissal of a speeding ticket issued to a Millville judge

last year. According to Mayor Patrick Fiorilli, Hoffman's resignation was prompted by an investigation the county prosecutor's office began concerning why he found Millville Municipal Court Judge Jerome Okoniewski not guilty of speeding.

Vineland Police Patrolman Stephen Schneider, who clocked Okoniewski driving 77 mph in a 55 mph zone on Route 55, apparently sparked the investigation when he protested Hoffman's decision. Fiorilli said Hoffman dismissed the charge on the grounds that Okoniewski was on official business when he was pulled over.

Bridgeton Municipal Court Judge Isaac Serata presided over the Vineland court recently. He said he will continue as interim judge until a new judge is appointed.

No formal charges have been filed against Hoffman at this time. County prosecutor Kenneth Pagliughi refused to comment on whether an investigation of Hoffman is in progress, but other sources confirmed that transcripts of Okoniewski's case have been seized by the prosecutor's office.

Superior Court Assignment Judge Philip Gruccio said he was "inclined to believe" Hoffman had resigned as a result of the traffic ticket issue, but made no further comment.

Florida Cabinet Okays New Standards For Police Radar Equipment

The Florida cabinet recently established tough standards for newly purchased police radar. It is also allowing the continued use of old equipment not meeting the standards, but only under special restrictions.

A lawyer for the Department of Highway Safety and Motor Vehicles assured Gov. Bob Graham and the Cabinet that the rules go as far as possible in meeting objections to the use of current radar equipment by several judges throughout the state. The rules that were adopted were basically the recommendations of the radar study commission established by the Legislature during the 1980 session. They establish requirements for accuracy and reliability in radar equipment purchased after August, 1982.

The Florida Highway Patrol and local law enforcement agencies can continue to use equipment not meeting the new standards until it can be replaced with the newer devices, but several restrictions have been imposed. The equipment must be operated manually and cannot be left on automatic. Readings can be made only of vehicles actually visible to the officer. Also, operators of the equipment must complete a training course conducted by the FHP.

The Legislature established the study commission after several South Florida judges refused to admit radar readings as evidence to support speeding charges. The judges claimed that the equipment was often unreliable.

Graham wanted an assurance from highway safety officials that the rules will make readings from the equipment admissible in a court of law.

"This should make them admissible," said Judson Chapman, assistant general counsel. "It does as much as we can do at this point to make it admissible."

Radar Unit Catches Fire

Motorists traveling in the area of 28th and Duncan streets in St. Joseph, MO may have been luckier than they realized at the time, especially if they were driving in excess of the speed limit. Officer Gale Aspey had been on duty only a short time when she decided to run radar checks near that location. However, something happened and motorists were granted a reprieve.

Aspey had plugged in the radar unit and checked it for accuracy. Then, while she was looking for a place to park her squad car, the radar unit shorted out and caught fire.

"I had just started down 28th Street when the wires of the radar just burst out of their rubber casing," she said. "Smoke filled the car and I stopped it as quickly as I could."

Working from outside the car, she finally pulled the entire radar unit from the vehicle — away from other even more valuable police equipment — and put it on the street. No other radar units were available, so vehicles in that area, at least, remained free from radar patrol that evening.

Another Texas Speed Trap

B. W. Presley is proud of the city's reputation of being hard on traffic violators. His turf is a square-mile island in Southwest Dallas, where downtown is old-time storefronts, life is in the slow lane, and courtesy is in style. Cockrell Hill, TX is a place where aging houses are still affordable and businesses stay small.

But to some, Cockrell Hill is also a speed trap. And there is little question that the city thrives on traffic fines and bond forfeitures. The hamlet of 3,262 residents collected \$49,999.98 in fines and bond forfeitures — mainly for traffic-related offenses — during the first six months of the fiscal year.

That equals more than one-fourth of the Police Department's \$191,000 budget for 1982. Bond forfeitures and fines were higher than in Duncanville, a city with more than eight times the population of Cockrell Hill.

"That just makes me feel that we're doing our job," said Presley, proud of the reputation that Cockrell Hill is hard on traffic violators. "It doesn't hurt us any. It just means a person won't speed through this town," said Presley, who rarely wears a uniform.

Canadians Test Radar's Accuracy

About 200,000 Metro motorists paid more than \$3 million in fines last year after being nabbed in police radar traps that the courts consider foolproof. But the *Toronto Star* test of the same radar gun Metro police use — conducted by its inventor, Fritz Engler — showed radar is not infallible. Using his radar gun in a mock speed trap, Engler pinpointed an innocent driver.

Critics say as many as one in three speeding tickets are given in error; however, authorities dispute this, but the numbers involved are awesome. Even if only 1 percent of radar speeding tickets were wrong, it would mean 2,000 Metro motorists are being slapped with bogus speeding tickets every year and losing demerit points if the radar said they were going more than 9 mph above the speed limit.

Last year, Ontario Provincial Police used radar to issue 188,032 speeding tickets worth more than \$2.8 million. While United States officials recommend a five day, 40 hour training course for radar officers, Metro police get just two days' training, of which only one day deals with radar theory.

Glen Martinson, professor of electrical engineering at Ryerson Polytechnical Institute, who watched Engler's demonstration, said it proves how crucial police radar training is. "I don't think there's any way you can take the human factor out. The machine doesn't have eyes and ears."

Engler, chief engineer for Tribar Industries on Weston Road, set up a mock speed-trap on Queen's Quay E. to show the *Star* how well his police radar works. He spied two test vehicles driving toward him: first, a sub-compact Chevrolet Chevette, followed by a Ford van from the *Star* garage. The radar on his dashboard showed 36 mph and, as the Chevette zoomed past, Engler made his call: "The front one was doing 60." He was wrong!

Engler's mistake, using the machine he knows more about than anyone else, is a good example of what can go wrong with police radar — it can't read license plates. In fact, the Chevette never went beyond 30 mph. The *Star* van driving behind it had accelerated to 36 mph to catch up after the Chevette got a head start. Engler assumed the nimble Chevette was guilty, but while Engler had his eye on the car, his radar was tracking the Ford van directly behind it.

Looks like there might be another "Great Miami Radar Trial" brewing.

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

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Pages From A DX Listener's Scrapbook

Rare QSLs From Before World War II

STOCKTON U.S.A. California

KWG

VERIFICATION OF RECEPTION
Anthony G. Tarr
Sept. 13, 1937 2:30-2:50 AM PST

Station KWG, Stockton, CA, was running 100 watts when monitored on 1200 kHz more than 40 years ago!

W4XB

Thank you for your report of the reception of W4XB on November 15, 1938. We are happy to verify this report.

By *Ruth Richardson*

We hope you will be a regular listener and that we may have the pleasure of receiving additional reports from you.

W4XB operates on a power of 3,000 watts and is an international broadcast station operating in conjunction with station W4XIP. Transmitters of both stations are housed in the News Tower, Miami, Florida. L. R. A. Miami, known as the "Piercing of the World," is a famous seaport and winter resort located on the southern coast of Florida by the palm-fringed shores of Biscayne Bay in the American tropics.

ISLE OF DREAMS BROADCASTING CORP.
NEWS TOWER, MIAMI, FLORIDA

In the late 1930s several broadcast stations were experimenting with shortwave relay transmitters which sent out their programs on "Ultra High Frequencies," that is, above 25 MHz. This QSL from W4XB in Miami is from the relay station operated by station WIOD.

TRYING TO GET OUT WITH A 100 WATTS and 250 watts

Our Program

10/12/38 Day
4:09 A.M.
P.M.

I GOTCHA AND HOW!

Auburn, NY is the site of a large prison. Not too many people get out of Auburn, but in 1938 this little 100 watt broadcasting station, WMBO, made the trip.

One of the earlier QSLs in my scrapbook arrived in 1925! It was from station WCX, known as "The Old Red Apple Station," in Detroit. After several changes of ownership, WCX eventually became known as WJR—still on the air!

WACERAU ESTONIA, Jaama 8, TAPA.

ES5D

Radio: _____ Date 19. 11. 38 RST _____
Frequency _____ mc. TX CO-FD-PA, 50 WATTS

By QSL Trx by 73° K. KALLEMAA.
much for the next de QSL! 73° and 11/11/38

Estonia was a small Baltic country which was overrun in the early days of World War II. Eventually it was "liberated" by the Russians who decided to annex it to Russia. Today Estonia lives only in hearts and memories—and in my scrapbook as a QSL card from Ham operator ES5D, who QSL'd in 1938 just before the end of the nation's existence.

FORT MILLS, CORREGIDOR
PHILIPPINE ISLANDS

KA1GH

Kallex

RADIO: _____ QSL OUR 10.6.5 MC QSO _____
RST _____ QRM _____ QRN _____ QSB _____
RIG HR _____ RCVR HG 12R _____
REMARKS: FOR KALLEX C.W.K.P. LAKHIA

GEORGE G. NATHAWAY,
DET. 10TH SIGNAL SERVICE CO.

This Ham station was monitored from Corregidor in late 1941. Within a few months after that the island of Corregidor would be the site of one of the most violent battles of the Pacific Theatre of World War II.

MEX

Announcing
its thanks for
your kind words.
Come up and
see us sometime!

PEARL HARBOR, HAWAII
Co. B. D. Marine Barracks
 Radio Hrd Hr 19
 Q's R Bond
 Working
 Calling

K6SWL

ALONG FROM HAWAII

REVISIONS: Antenna...
 Remarks: I AM APPLYING FOR MEMBERSHIP IN THE "HAWAIIAN SWL CLUB" AND WOULD BE GLAD TO RECEIVE A CARD FROM YOU.

BOB HOWLAND
 Vy 73's

WBXL PRINT

Here was a card I swapped with a fellow SWL (Short Wave Listener) in December of 1941—he was in the Marines and stationed at Pearl Harbor. This card is postmarked December 6th, less than 24 hours before the attack which brought the U.S. into the war.

THE BOWDOIN KENT'S ISLAND EXPEDITION
BAY OF FUNDY

VE1IN

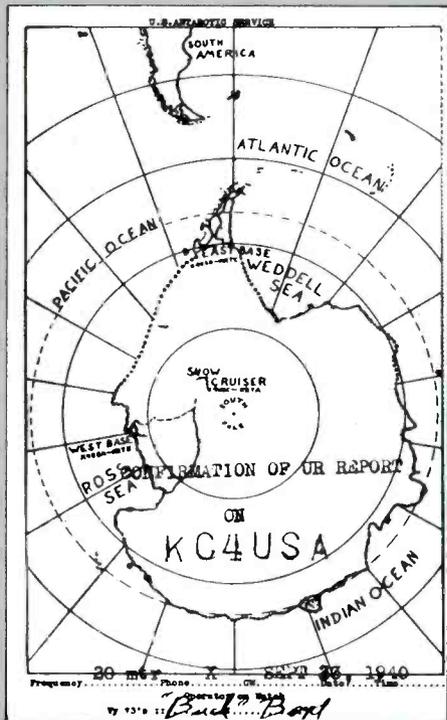
Headquarters Address:
 Thomas Gross - WIJZM
 Brunswick, Maine, U.S.A.

TRANSMITTERS: 1000 watt phone on 14,285, 4797.5, and 3885 Kc. Harvey UHX-10 on 3.5 and 28 mc. aboard "Scientist", POWER SUPPLY: 2 gasoline driven plants with 5 kw output. RECEIVERS: RME-69 with DB-20 pre-selector, Masterpiece V, and SW-3. VE1IN has a special frequency assignment, 4.8 mc., for bird song recording and rebroadcasting purposes. A 4000 foot terminated rhombic antenna is used on this frequency.

To Radio SWL #2 We are pleased to verify your reception of our station on 3888 Kc. Remarks: Your report was interesting but have no XYL only YL's. Who would long for an XYL?

Your signals RST
 WIJZM "Tom"
 WJKE "Fred"
 WIKJU "Murray"

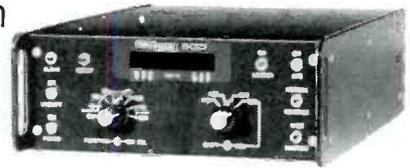
An expedition to Canada's Bay of Fundy was assigned the callsign VE1IN. I heard them while their vessel was transmitting weather data to a shore station.



The exotic and remote continent of Antarctica produced this QSL from U.S. Navy Ham station KC4USA back in 1940. The QSL arrived 7 months after the station's transmission was monitored.

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Hicksville, New York 11801

FREE RADIO FOCUS

BY AL MUICK

ACTIVITIES OF UNDERGROUND BROADCASTERS

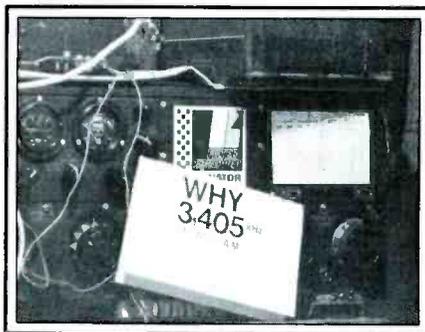
First this month is some more Free Radio news from the USA. WCRS, ID'ing as the World Community Radio Service, has been noted active on 6975 kHz around 0200 to 0500 GMT on a Saturday/Sunday. Their address is c/o Box 4948, Arcata, CA 95521. KQSB has been recently noted on 7425 kHz between 0300 and 0500 GMT on Saturday/Sunday. Their programming sounds very professional, and they play a light assortment of rock music. If you send a reception report, address it to Mr. Frank Furter, KQSB, at the Arcata, CA address mentioned above. They also have an occasional five watt QRP test on 14221 kHz.

The Voice of SYNCOM has returned and is active on 7373 kHz around 0400 GMT on a weekend, although the operator occasionally turns "renegade" and operates any night of the week he chooses. SYNCOM is best remembered for their "Wimpy Willie" comic series about a DXer who was too "chicken" to get involved in pirate broadcasting. Radio Indiana has also been active recently on 7390 kHz at around 0400 GMT playing some golden oldie classics and comedy skits. They seem to have some technical difficulties as their signal occasionally "walks" up and down the dial, which, I guess, makes for a rather easy identification.

The Voice of the Pyramids is another pirate that has been around for a while. It prefers early morning operations (around 0500 GMT) and has been currently active on approximately 6278 kHz. Their programs never really last that long (20-30 minutes is the standard), but they are very enjoyable, with a good variety of hard rock music to be heard. Another return to the airwaves is Radio Free San Francisco, which has outrageous skits/commercials. If you get off on far out comedy, this is the station for you! Your best chance to hear them is on their new frequency of 6212 kHz around 0200 GMT on a Saturday/Sunday.

WOIS is now active on 7415 kHz at around 0600 hours GMT. WOOF, another station that has been around for a while, can be heard occasionally on 7425 kHz. KCFR is using 6860 around 0700 GMT; this station has very good-sounding PSA's for Free Radio and even has a program for DXers.

Moving to the New York side of the affair, WPOT can occasionally be heard on 6815 kHz around 0200 GMT with some of the best modulation that has yet been heard on a pirate station. WFUN is a "newbie" to the low frequency pirate stations that crop up in the 1600-1640 kHz area. They currently use 1630 kHz at around 0500 GMT, and it appears that announcer Niel Down is not very technically minded or cares about his



A dual purpose card serving as a QSL plus a photo of the WHY transmitter.

listeners, as he moved his VFO to 1623 right in the middle of a song!!!

Most of the above stations use the aforementioned Arcata, California address for their maildrop. Some of them use other addresses and also phone numbers, so you'll have to listen to the broadcast to get the most current information.

If any of you consider yourselves good DJ's and would like to produce some programs for a European pirate called Radio Telstar (hard rock only!), please make a 30 minute demo tape and send it to Radio Telstar, c/o SP/4 Al Muick, 3rd Opns BN USAFSA, CMR Box 1912, APO NY 09458. All tapes will be listened to and you will be notified if you're chosen to be on the "Telstar Team." Tapes will not be returned unless requested and return postage is enclosed. The chosen DJ's will receive postage and tapes for their monthly shows. Good luck!

Now for part of the Story of Radio Gerona International.

Early in 1978, Hendrik Gerona, the founder and station manager of Radio Gerona, at the tender age of 14, began to build a small AM transmitter because some of his neighbors were already pirating and he wanted to do it, too. His first transmitter was a one-tube job and rather simply constructed. During the span of time, the young man learned very quickly how to make use of the most modern technology. In a few months, he had improved upon old schematics and had built larger and more powerful transmitters because he couldn't "get out" very far with the one-tube he had originally built.

At first, he had many problems with the impedance mismatches of his antenna (remember, he was only 14!), which was at first 50 meters and then grew to 120 meters in length. But this was soon resolved with the help of a few technically-minded friends. The modulation only produced new problems for our young fellow, but once again the help of his friends paid off and he began

regular transmissions in Dutch on 1323 kHz/227 meters on Sunday mornings. It was called Radio Northsea and was listened to by the neighborhood; it developed a kind of cult following. The station was not yet named Radio Gerona, as this name first came into use when the station commenced shortwave transmissions.

A little later, Hendrik learned about shortwave from the station personnel of a local shortwave pirate station who were having immense success with an old army transmitter, a BC 191N (Dutch army). Hendrik was impressed with shortwave radio and the idea of reaching so many people over large distances and getting letters from them. It took a little while, but eventually his three-stage, crystal-controlled transmitter for 48 meters was ready. The very first official test was on the 28th of December 1980 on 6290 kHz with 30 watts output into a full-wave longwire. It was received very well in all parts of Europe. At first, he again had problems with the modulator because it was only rated at ten watts and did not fully modulate the transmitter.

In the early part of 1981, many experiments were tried with the transmitter and antennas because a regular program service was envisioned for Europe. The antenna was erected in a better location, and instead of a longwire, a half-wave dipole setup was used. Last, but not least, the transmitting studio was renovated in order to make everything RF proof for shortwave.

On the first Sunday in May, 1981, things had come this far: at approximately 0900 GMT, the tuning signal of Radio Gerona (*Wilhelmuc*—Dutch national anthem) rang out on 6290 kHz on the 48 meter Free Radio Band. From that point on, the same tuning signal has been used. Also on this day, Radio Gerona International (RGI) began its international service. At that time, the station transmitted only in English and Dutch and the two disk jockeys, Brutus Pancake and Hendrik Gerona, presented and stuck to a hard rock music format. They considered themselves to be the reincarnation of the former pirate station Radio Nolan International, and at that time no other hard rock music pirate existed.

On Sunday, the 7th of July, 1981, a new DJ and an extended program schedule came to RGI. The DJ was Daniel Kay and his German language program was presented at the end of RGI's international service. RGI now transmitted every first Sunday of the month from 0900 to 1100 GMT and the program schedule went like this: from 0900 to 0930 GMT was the *Dutch Program* from Hendrik Gerona; from 0930 to 1000 GMT

was the English *Mailbag Show* with Brutus Pancake; from 1000 to 1030 GMT was Hendrik Gerona's *Heavy Metal Show* in English; and from 1030 to 1100 GMT was the *Daniel Kay Show* in German. At first, the programs from Hendrik Gerona came live from the transmitting studio, and the programs from the other DJ's were on cassette tape and played on the Sunday.

The music format of RGI is still (and always will be) hard rock music, which is sometimes known under the nickname Heavy Metal. Some listeners sent letters requesting RGI play something other than hard rock. Therefore, in the *Dutch Program* and *Mailbag Show*, some oldies are presented. The Hendrik Gerona *Heavy Metal Show* and the *Daniel Kay Show* are based upon the music requests of the listeners and are still hard rock programs. Another specialty of RGI is the LP of the Month program in which an LP, chosen by the station staff, is played throughout the transmission. In the German Program from Daniel Kay, there is another specialty spot call *DX Telegram*, which is for the DXers who are tuned into the station. It consists mainly of information about the Free Radio World, although some other DX tips are also given out.

Towards the end of 1981, the activities of the Dutch RCD (Radio Controlle Dienst-Dutch FCC) became more and more severe against the shortwave pirates, and Radio KPO, Radio Holland International, Radio Jan Rap, and Radio Hotel Amigo were raided. Since RGI did not want any problems with the RCD, they temporarily stopped transmissions until the beginning of the new year, hoping the "situation" had calmed down a bit. In the meantime, RGI was anything but inactive: the studio was once more renovated and the transmitter was once again modified. During the winter, tests were conducted on 48 and 41 meters in order to properly fine tune everything, because RGI wanted to make a test to the USA. It happened a little later than planned, but in February, tests were conducted to the USA on 48 and 41 meters, mainly on 6290 kHz, 48 meters. The success of these tests was not particularly overwhelming, but nonetheless, two reception reports were received from the USA—one from Boston and one from New Jersey! Before the restart of regular programs, new jingles were produced by good friends from The Hague, Pioneer Produkties.

On Sunday, the 7th of March 1982, RGI returned with regular programs and transmitted them once again on the first Sunday of each month. Around 0900 you could hear RGI's rebirth on 6235 kHz and the signal was received well all over Europe. Forgotten was 6290 kHz, as there was always so much interference from utility stations; the last programs had been transmitted on 6235 as well as 6275 kHz. The station first broadcast the Dutch National Anthem and continued with the usual programs, and, on the 7th of March, the first birthday of RGI was celebrated with a prolonged program schedule. This is the cur-

rent, planned program schedule:

Summer / Winter Program			
GMT	0900	0900	Sign-on + <i>Wilhelmuc</i>
GMT	0903	0903	Henk's <i>Dutch Program</i>
GMT	0930	0930	Brutus Pancake <i>Mailbag Show</i> and <i>Record Request Show</i>
GMT	1000	1000	Hendrik Gerona's <i>Heavy Metal Show</i>
GMT	1030	1030	<i>Daniel Kay Show</i>
GMT	1040	1040	<i>DX-Telegram</i>
GMT	1100	1100	Close Down

From the beginning of the shortwave service, the station received several hundred

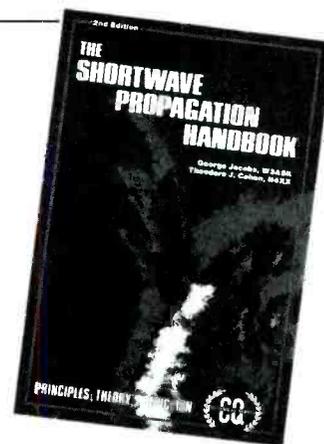
letters and reception reports from 12 different countries. For the most part, the listeners were very constructive with their comments, especially several listeners in Germany. Unfortunately, a lot of reception reports never included a SINPO code rating and some program details were skimpy at best and not much criticism was offered. After a few messages over the air telling the listeners what was wanted, that problem cleared up. Hopefully, this will give you some idea of how a pirate station is run.

If you have any ideas or technical hints, etc., that you'd like to pass along, please feel free to send them to my address as listed previously in this article. C U next month! de AL

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Beaming In (from page 6)

number of potential problems in establishing and administering such a service; and rightly so, I imagine.

Even if FCC type approved sealed transmitters were sold for use in such a service, problems would arise with the use of unauthorized high power equipment. Problems could arise with operators fighting over the rights to a certain frequency in a local area, even if the service was established on an "interference expected" basis. Within the widest interpretations of free speech, there would nevertheless be glitches relating to matters of slander or personal (verbal) attacks that might be broadcast, or obscenities. Questions would arise concerning the broadcasting of material that is covered under copyright laws. Music publishers would want to be paid royalties for the use of their songs (as is the practice in broadcasting), and they are entitled to such payment.

Licensing standards would have to be established. No matter how liberal they might strive to be, the FCC would most likely want to assure that transmitters were not operated by unsupervised youngsters. They might wish to decree that licensees must be individuals rather than business or corporations, political organizations, or religious institutions. No matter what standards were established, some prospective broadcasters would undoubtedly be excluded. Also, a mechanism would have to be established to cover revocation of licenses for specific causes, as well as a method of actually removing from the airwaves stations which have had their licenses revoked.

These may well be problems that will prove to be unsurmountable. We will never know unless the FCC takes a serious and lengthy look at what's involved. At this point, all that exists is an obvious desire for such a radio service and the fact that a growing number of people seem to be taking to the airwaves minus FCC licenses. Such stations could, in addition to providing the outlets for free expression that they initially propose, could also be of genuine service to the community by providing local or neighborhood information thought to be too specialized or "insignificant" for broadcast by commercial stations.

Well, somehow there should be a way to establish something along these lines, and in my opinion the time has come to explore the idea on all of its levels. I'm open for any thoughts about it from POP'COMM readers. Whether you think it's a good idea or a poor one, why not drop me a card or letter and give me some feedback.

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| 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 |

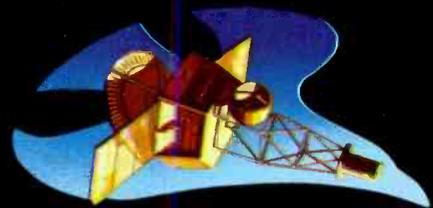
AD INDEX

AEA/Adv. Elec. App	11, 22, 27
BMW	1
Birdview Satellite Comm	Cov. III
Communications Electronics	4, 30, 48
DOC	47
Digital Electronic Systems	71
Direct Video Sales	32
EGE	19
Electronic Discounters	65
Electronic Equipment Bank	69
Electronics Overseas	58
Hal Communications	39
Ham Shack	55
Heath Co.	7
Hustler Communications	6
ICOM America, Inc.	Cov. II
International DXer's Club of San Diego	74
KLM Electronics, Inc.	2, 3
Lewis Construction Co.	58
Long's Electronics	Cov. IV
Macrotronics	65
MFJ Enterprises, Inc.	13
NRI	41
Panasonic	49
Pop Comm Book Shop	75
Sony Corporation	46
Tayco Comm.	19
Tem Microwave	74
Tennessee Electronics	63
Universal Communications	44
Universal Electronics	55, 74
Winn-Tenna, Inc.	12
Z-Tech	68

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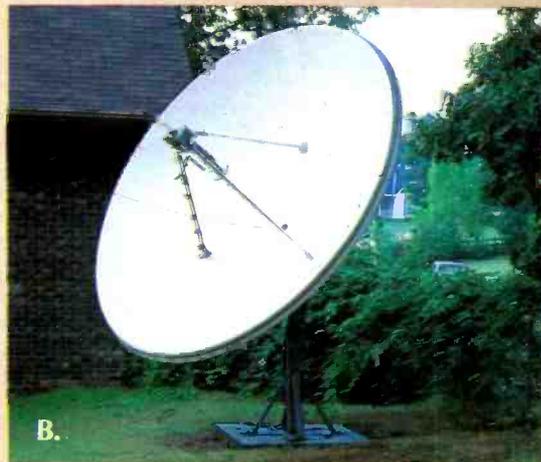
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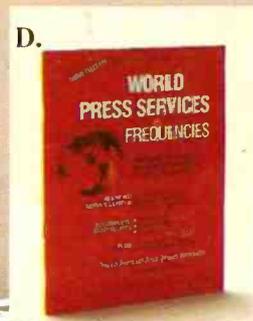
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