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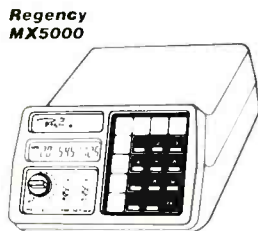
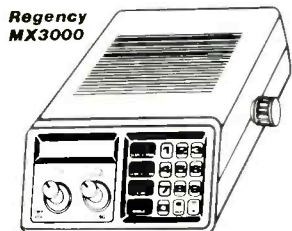
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JULY 1984

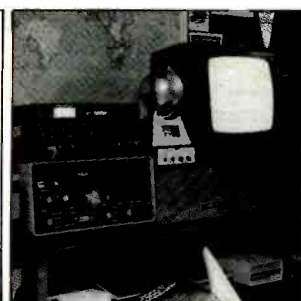
VOL. 2, NO.11



6



13



52

FEATURES

How To Hear Central America And The Caribbean On Your Scanner 6

Guerrillas, G.I.'s, maneuvers, war . . . and more!

by Chuck Robertson, IL-141 and Dave Beauvais, KB1F

Scanning In Olympic-Town 13

Going to the Olympics in Los Angeles this summer? Here are some frequencies you may want to monitor!

by Randy Canigliaro, KCA6UH

165 Fantastic Frequencies 16

There's never a dull moment on these frequencies. Maybe you should check them out.

by Alice Brannigan

Deutschland DX 18

A summary of broadcasting from Germany (East and West).

by Gerry L. Dexter

Listening In On America At Play! 24

A wide variety of outdoor activities requires the use of radio communications. Here's how to listen in on the behind-the-scenes action!

by Rick Maslau, KNY2GL

Secrets Of The Silent Service 27

Those old submarines—untangling their radio callsign mysteries.

by Tom Kneitel, K2AES

Monitoring Mossad: The Israeli Intelligence Service 35

You've probably heard these mystery "phonetic alphabet" stations and wondered about them! Here's the key to finding out more.

by Greg Mitchell

Lightening Your Load And Other Communications Horrors 38

Electricity on the rampage is a lot worse than you think!

by Don Tyrrell, W8AD. Alpha Delta Communications

Product Spotlight: ICOM's HF/VHF/UHF Radios 43

Summary of six radios to cover your listening needs.

Books You'll Like 70

Some books of interest we thought we'd pass along to you.

This month's cover: Now's the time to monitor for Central American military and paramilitary communications. Photo by Larry Mulvehill, WB2ZPI.

DEPARTMENTS

Beaming In	4	RTTY Monitoring	58
Survival	40	Broadcast Topix	60
Mailbag	42	Satellite View	64
Communications Confidential	44	Scanner Scene	66
On The Line	46	Pirates Den	68
Radar Reflections	50	Washington Pulse	72
Listening Post	52	Communications Shop	75
POP'COMM Products	56		

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CIRCLE 75 ON READER SERVICE CARD

BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

Privacy Of Communications

There used to be a sidewalk pitchman who was an almost-permanent fixture on a certain downtown street corner when I was a kid. He hawked a little "100-in-1" gizmo that he claimed could open cans, peel potatoes, sharpen knives, chop ice, scale fish, and perform practically every other task known to humankind except the cure of warts and lumbago. He sold a lot of these things because I suspect that we Americans are strangely fascinated by "all purpose" inventions and devices. I saved up my nickels and dimes and bought one of these miraculous inventions to bring home as a boon to my family. It was graciously accepted but soon put into the special kitchen draw which was the repository for eraserless pencils, short lengths of string, half-scissors, loose Plaid Stamps, bent nails, and stripped-out screws. This was the *oblivion draw*—the final resting place for useless trivia that served no real function but which we somehow decided to retain.

The obsession for all-purpose things and panaceas continues to this very day, and we seem to have maintained our dislike for fully disposing of them even after they have proven themselves worthless. It's one thing to put up with this in the form of a \$1 kitchen gadget, but quite another to be faced with a 50-year-old all-purpose law which seems equally useless. I'm thinking about Section 605 of The Communications Act of 1934, the statute which addresses itself to secrecy of communications. The one-paragraph statute essentially says that communications addressed to one person shouldn't be revealed to outsiders by non-addressees who might overhear the messages, nor can information obtained in such a manner be used to the benefit or gain of those to whom it was not addressed. Radio broadcasts and ham communications are not covered by this law which, otherwise, covers all FCC licensees.

The basic intent of Section 605, to be sure, is most noble. Those who wrote it obviously felt that keeping it simple and broad would cover all bases and keep it an all-purpose guarantee that messages addressed to one person or company will achieve some reasonable degree of privacy. Well, you know where the road paved with good intentions leads. Section 605 turns out to be one of the most ineffective, vague, ignored, misused, and toothless statutes ever chisled into granite. Its honorable intentions are about all it has going for it, and even a further clarification called Public Law 90-351 (in-

tended to protect against wiretapping) is of limited assurance to the public that private messages remain private. The intelligence community, public safety agencies, and many others (with or without authorization or user knowledge) are able to monitor phone calls, and that includes the phone company itself. Furthermore, the FCC itself is not bound to the observation of 605!

When the military lost the warhead of a Titan missile in 1981 after it blew up on its launching silo in Arkansas, the national news media carried word-for-word transcripts of the radio communications as military personnel looked for the trinket. Apparently the news services didn't think that Section 605 was in effect in that instance.

Radio and TV stations, in their news programs, have long been known to rebroadcast intercepted two-way communications gleaned from various frequencies used by public safety, CB, industrial, aero, maritime, and other channels which you'd think would be covered by Section 605. Also, it's no startling revelation for anybody to learn that some ambulance services, ambulance chasers, private investigators, tow truck operators, burglar alarm installers, taxi dispatchers, fire insurance adjusters and others have often made use of overheard radio communications for their own gain. News reporters, too, have been known to take commercial advantage of information they've monitored. Not that long ago there was an instance of a fellow who brought a civil suit against a TV station because he claimed that their mobile news crew overheard information which enabled them to hang around the site of a ransom drop which resulted in scaring off the persons who had kidnaped his wife. Then there was the guy who overheard radio conversations between the offensive coordinator of the San Diego Chargers and the team's offensive line coach on the field. He tape recorded the conversations and turned over the tapes to a sports columnist who discussed them at length in his newspaper column. If there were any violations of Section 605 in any of the foregoing instances, you'd never know it based upon any actions brought on its behalf.

One might therefore come to the conclusion that, in a nutshell, Section 605 is an effort intended to recognize that there are questions of privacy invasion which could come into play from time to time, but that it isn't brought into play with any regularity or consistency. When viewed in the context of

the 1980's and the state of communications technology, it seems to be fuzzy or inadequate. Undoubtedly it has been a deterrent to at least some invasion of communications privacy over the years, especially when those invasions were being considered by those who were naive or faint of heart. As time has progressed it has proven to be effective on a steadily diminishing basis, what with technological advances and the state of society these days. Today, intelligence and law enforcement agencies have found it necessary to monitor the private communications of certain elements of society. Industrial espionage is a big business. Political espionage is rampant, as is amateur bugging and wiretapping. Personal privacy on any level at all becomes a matter of degree when viewed in light of the amount of information about us stored in the computers belonging to employers, banks, credit companies, insurance companies, hospitals, schools, courts, motor vehicle bureaus, the 'phone company, and federal/ state/county/local agencies.

Nevertheless, that old all-purpose do-gooder, Section 605, is still on the books and from the looks of things it does not seem to be particularly relevant for guaranteeing you or I substantial peace of mind regarding our privacy. On the other hand, don't think that Section 605 is totally impotent. There are some rare instances where it has come into play in the manner for which it was probably intended. About five years ago a fellow in Wisconsin was dragged into court and hit with a charge of Section 605 violation. Seems he owned a scanner and was monitoring law enforcement frequencies. From those efforts he learned that several unsavory characters were under surveillance. He then contacted those persons and advised them that they were being watched. He was convicted and received an unpleasant sentence.

For the most part, the present use of Section 605 has been applied of late in some novel ways. Last February a federal judge applied the law in a civil suit brought by a New York cable TV company against a man who was selling cable TV descramblers known as "pirate boxes." U.S. District Court Judge F. X. Altamari's decision was similar to previous decisions rendered in similar cases in Florida and Ohio, and he also told the fellow selling the boxes that he'd have to pay damages to the cable TV company for as long as the TV people could prove he had been in business. Section 605 has also been waved around by TV companies who seek to stop home viewers from erecting microwave antennas on the roofs of their homes in order to get a free peek at MDS point-to-point pay-TV distribution transmitters. Furthermore, "605" is also run up the flagpole by suppliers of background music to stores, banks, cocktail lounges, and offices whenever they learn that an unauthorized establishment has commenced playing their soothing tunes—even though that music is usually delivered piggyback via SCA and hidden within the signal of an FM broadcast

station. It's ironic that broadcast related services are the primary folks getting any mileage out of Section 605 when it was not intended to relate to broadcasters! And the FCC has generally supported these companies in their quest!

Other than its application by cable TV and other broadcast-related establishments, Section 605 seems to be really used only in an instance like the fellow in Wisconsin, or when it has been violated by someone who has been tagged with a whole string of serious criminal charges. They toss in Section 605 for good measure as they throw the book at him (some have observed that perhaps this is done when the "case" against the guy is a little weak and it's a matter of grasping for straws).

I think that part of the problem with Section 605 is that before there is any way it can be applied, someone has to step forward and file a formal and official complaint (probably with the FCC) stating that because of some specific act, their communications privacy has been trod upon. Straightaway this sounds like such a complex and time consuming exercise in red tape that there are probably few instances which would cause anybody to devote the time, effort, manpower, and resources to pursuing the matter, and then prove the claim and see it through to its conclusion in a court. Obviously cable TV and background music companies (backed by court precedents, claims of financial losses, and the ability to muster legal resources) find it viable to press such complaints. They have not been disappointed with the results.

In the instance of the fellow who told the suspects that they were under surveillance, he was probably a wiseguy or a boob, or both. Anybody with an IQ of 25 would have immediately seen the lack of wisdom in such an act and then desisted. Forgetting Section 605, it certainly was a stupid thing to do in any event.

In all fairness, it does seem that communications privacy involves questions of common sense on at least an equal basis with legality. Because the law is so seldom involved in connection with the invasion of personal privacy, it's difficult to assess its true potentials based upon its spotty track record. Unfortunately, it falls into a strange classification that makes its possible use as a statute used for selective harassment very high. As a working bread and 'taters law that has any real application in the normal course of our lives, it has been of little value. It is openly ignored without any evil intent, more often than not by persons who don't know about it or who do know about it and see it as so outmoded, inadequate, broad, vague, confusing, and hard to use that it's probably not worth worrying about unless a cable TV system is the potential aggrieved party.

Yet there's no doubt that there are consid-

(Continued on page 74)



Oliver "Perry" Ferrell (1920-1984)

An Old Friend Passes

One of the DX hobby's most colorful and interesting members has passed from the scene. Oliver P. "Perry" Ferrell was fatally injured in a car accident last April 21st.

Perry got started in the hobby in 1935 and over the decades his byline appeared on more than 400 articles and editorials. During WWII he did research in communications with the USAF and from 1951 to 1954 he was the Editor of our sister publication, *CQ* magazine. After he left *CQ*, Perry became the first Editor of *Popular Electronics Magazine*, and went on to be the Editor of *Stereo Review*. It was under Perry's guidance that countless novice authors got their start (myself included).

After Perry retired from the hectic world of magazine publishing he devoted his immense energies and talents to the operation of Gilfer Associates, a company he ran with his wife, Jeanne. Gilfer is well known within the DX community as suppliers of communications products, and publishers of DX books such as the *Guide to RTTY Frequencies* and *The Confidential Frequency List*, amongst others.

Perry was one of those unforgettable people who was perceived totally differently by just about everyone with whom he came in contact. To some, he could be rather irascible, to others he was a sage advisor who would gladly share his encyclopedic knowledge of monitoring, while others knew him as a serious researcher in radio propagation and the technical aspects of communications equipment. In the 28 years that I knew Perry, I must say that I was exposed to these and also the many other intriguing aspects of this most fascinating and complex person. No matter how one perceived Perry, there was no getting away from the fact that he was certainly a compelling presence; a brilliant and unique man whose sudden and untimely passing is a great loss.

We at *Popular Communications* extend our heartfelt sympathies to his family.



How To Hear Central America And The Caribbean On Your Scanner!

Guerrillas, G.I.'s, Maneuvers, War... And More!

BY CHUCK ROBERTSON, #IL-141 AND DAVE BEAUBAIS, KB1F



Some installations run communications on many frequencies simultaneously.

Without a doubt, some of the most easily-heard and intriguing VHF Low Band skip to sneak across our American borders in recent years has been in the form of sensitive communications from highly controversial—and in many cases, highly secret—military operations in Central America.

A case in point: the recent joint U.S./ Honduran military exercises known as “Big Pine I” and “Big Pine II” have filled the lower end of the 30–50 MHz VHF band with fascinating tactical communications on a regular, sometimes daily basis. The presence of a permanent cadre of American advisors in Honduras, coupled with the widely-reported establishment of long-term American support bases in that country, make it a good bet that this tactical activity will continue to be heard for a long time to come.

With the sporadic E season now upon us, “double-hop” propagation from Central America to most parts of the United States promises some very thrilling reception indeed. But even during winter and spring months, the tendency of signals between approximately 30 and 35 MHz to propagate well along a north-south path has produced some astonishing and unexpected catches—which can only be described as a military security officer’s nightmare and a scanner enthusiast’s delight!

The Yankee/DX Connection

So what’s really happening down there?

Observations made during the Big Pine exercises indicated that U.S. and Honduran military personnel worked together amiably, although a language barrier sometimes led to minor problems. The U.S. military appeared to dominate the operation—at least from the standpoint of managing communications logistics; and personnel were frequently found hopping from channel to channel as they tried to keep field operations well-organized. “Headquarters” or “control” channels were manned by both Hondurans

and Americans. (See Table 2 for a log of unusual Low Band frequencies carrying U.S. military traffic from Central America.)

In November 1983, with more than 5,000 American troops and 6,000 Honduran soldiers participating—and aided by strong early-winter F-layer propagation on the north-south path—tactical communications virtually saturated the bottom end of the VHF Low Band. During one particularly heavy period of war games, an English-speaking Honduran stated he was using an “AN/VRC-46 and a whip.” These vehicular units have ten pre-set channels in the 30 to 76 MHz range, with an output ranging from 10 to 35 watts depending on the frequency used. (For a description of this and related field equipment, see “Get In On Uncle Sam’s High Tech Electronics,” *POP’COMM*, February, 1983, p. 8) For the most part, a 50 kHz spacing between active channels was noted in these exercises.

More joint military exercises are occurring this summer in Honduras. Maneuvers are scheduled to take place in the mountainous western region bordering El Salvador and Guatemala. The announced plan is for U.S. troops to participate, along with military forces from El Salvador, Guatemala, and Honduras, in “counterinsurgency” training, with a special emphasis on raising the profile of the Guatemalans in the region’s highly-polarized military theatre.

Evidence seems to point to the fact that these exercises are less a showpiece than they are a cover for funneling U.S. military support to forces bent on overthrowing the leftist government of Nicaragua. These *contras*, as they are commonly known, figure prominently in our story as well—since *someone* in the region has been heard using very sophisticated, high-tech radios (employing, at various times, both digital and analog voice scramblers, as well as unscrambled Spanish), to make some very tense, terse, and seemingly under-fire transmis-

sions monitored here in the states (as we shall see).

Our own military, by comparison, uses virtually no scrambling in its Big Pine tactical operations on these frequencies; while these mysterious, high-security, scrambled radios are precisely the type of equipment that one would expect to be included in the not-very-secret “covert aid” provided to the *contras* by the American Central Intelligence Agency.

In the last analysis, one of the really exciting things about this “freak” propagation from Central America is that it gives you an opportunity to hear for yourself what’s *really* going on down there—and quite possibly, to add something entirely new to our public knowledge about clandestine guerrilla activities, which the intelligence community seems to want to keep hidden.

The evidence that contras are being supported with American-made high-tech scrambler radios which are more secure than even our own military communications links is curious in itself, having been accidentally discovered by one of the authors in the course of routine monitoring operations with a scanner—even before *Popular Communications* reported this fact in the September, 1983 issue (“Nicaraguan Rebels Use Yank Radios,” *POP’COMM*, September, 1983, p. 9).

The opportunity facing us as “civilian monitors” was stated by an editor of one of the radio club journals, who wrote: “It wasn’t until quite recently that it became apparent that a number of the things [we have been] receiving are of significant interest (other than the phenomenon of “skip,” which I have always thought of as interesting), and perhaps even of newsworthiness.”

(Spectrum) Space Invaders!

When the U.S. military conducts operations in foreign countries, the Low Band frequencies employed have a good chance of turning up on your favorite local public safety or business channels. There are several reasons for this.

In the first place, the radio spectrum is shared in common by the whole earth. Every nation and every army (and every police and fire department) has no choice but to use the same frequencies. Clearly, the Low Band component of military communications is only a *small part* of any tactical communications system—but it’s the part which Mother Nature has conspired to carry to your antenna, through various near-miracles of ionospheric propagation. So it behooves you to be thankful for her “gift from the blue,” instead of fretting about the High Band and UHF stuff you *can’t* hear!

Second, and more to the point: Band plans for frequency allocations differ in other countries, so military channels must be arranged so as to limit interference to local radio systems of the host country. There are numerous instances—some of them humorous—of bewildered stateside police and fire dispatchers doing verbal battle with strange-tongued (and even scramble-voiced) “aliens” who have mysteriously landed on “their” personal dispatch frequency!

Finally, it must be said that within the limits mentioned, the American military has never been bashful about seizing new radio frequencies on an *at-will* basis—with a cavalier aplomb that would land us normal radio mortals in the pokey in short order if *we* ever tried it! An acquaintance of ours who once served in the Army remembers “one summer tour I spent at Fort Bragg, North Carolina, when *all we did* was look for clear frequencies to use for Army field operations” in a skip-infested band!

Military communications (and the licensing of military radio operators, for that matter) is not under the jurisdiction of the Federal Communications Commission. Hence, ordinary FCC allocation tables are considered by military communications planners to be of an advisory nature only.

Table 1:

U.S. Government Official Channelization Chart

30.00-30.55
32.01-32.99
34.01-34.99
36.01-36.99
38.27-38.99
40.01-41.99
46.61-46.99
49.61-49.99

Note: A 20 kHz spacing between channels is most common, but there are many exceptions.

The 38.01-38.25 subband is set aside for radio astronomy, although there are some low power bases and mobiles operating there.

The 49.70-49.90 subband is shared with short-range unlicensed communications devices, such as cordless telephones. “Talkman” communicators, wireless microphones, toy walkie-talkies, and remote control units.

There are, however, certain portions of the 30-50 MHz band which have been set aside specifically for use within the continental United States by our military forces. These segments are listed in Table 1 and Table 2.

A quick comparison between Table One (“U.S. Government Official Channelization Chart, 30-50 MHz”) and Table Two (“Non-Standard Channels Logged With Central American U.S. Military Traffic, 1982-1984”) confirms our point: much of this traffic is *not* confined to the reserved military sub-bands. Tactical transmissions are liable to turn up *anywhere* in the band, although in practice the lower half of the band is more likely to survive the rigors of long-distance ionospheric transit than the upper half; the bottom 5 MHz should be viewed as prime territory for concentrated scanner search operations on any day of the year (and late into the evenings too, when spring and summer sporadic E conditions prevail).

Still, as in so many other aspects of this bizarre propagation business, the “rules” are determined to make fools of those who take them too seriously! Some of the most hair-

Table 2:

Non-Standard Channels Logged With Central American U.S. Military Traffic, 1982-1984

30.60	31.85
30.70	31.90
30.85	31.95
30.90	32.00
31.00	33.00
31.05	33.05
31.10	33.10
31.15	33.20
31.20	33.35
31.30	33.50
31.40	33.65
31.45	33.75
31.50	35.00
31.55	35.50
31.60	37.15
31.65	37.25
31.70	37.40
31.75	37.70
31.80	37.80

raising transmissions from guerrilla contras were in fact logged on 45.44 MHz—way beyond the bounds of normal propagation behavior in a declining sunspot year! Whether a patch of sporadic E was responsible is still not clear. The moral of this story: keep your ears open! Count nothing out! Anything is possible.

And at the other end of the band, don’t forget that the international common carrier/utility allocation *actually* begins at 29.7 MHz, just above the top edge of the 10-meter ham band. A lot of fascinating signals—including South American auto telephone and paging services—occupy that small piece of real estate between 29.7 and 30 MHz! It bears close watching, especially as an early indicator of a propagation path in the process of opening up to the higher frequencies.

Some Nuts And Bolts – And A Few Loose Screws!

So you’ve got your scanner hooked up to a good outside omni antenna—or a directional antenna pointed south—and it’s purring away in “Search” mode between 29.7 and 49.99 MHz. What, exactly, can you expect to hear? What’s in this for you, anyway? Are they *really* out there?

Let’s find out by taking a step-by-step tour up the band—bypassing strong local signals, of course; and for the sake of the demonstration, compressing the time line of a few years worth of monitoring down to a half-hour or so. Given those limits, what follows is a good healthy slice of the activity actually heard from Central America during the past two years, using nothing more than an array of Bearcat and Regency scanners, and very modest, garden-variety rooftop antennas. We’ll have to hop back and forth a bit to follow the traffic; but for the most part, we’ll scan the band in logical order, from low end to high. Flack jackets all set? We’re off!

30.00, 30.05, 30.10, 30.45, 30.55, 30.90, 31.45: Here we have U.S. military aircraft, monitored during the joint Marine/Honduran maneuvers conducted near Puerto Castilla in Northern Honduras. One pilot mentions he has to get permission from the Hondurans to participate in the mission. “Missions” may be war games, or they may be construction projects.

30.20, 31.70, 32.60: No sooner airborne, and already the flying is choppy! Here we encounter something known as “time division scrambling”—Spanish-speaking voices which sound like they’ve been recorded on magnetic tape, and the tape cut into little bits, and the bits pasted back together again in a random order! You can pick out syllables (or just phonemes), but it’s hard to make sense out of the transmission.

The system works something like this: imagine that a transmission one-half second (or 500 milliseconds) long is divided up into 5 millisecond slices. This means there are 100 “slices” in the complete message. But instead of stringing them together in a linear fashion (slice one, followed by slice two, followed by slice three, all the way to slice one-

hundred), imagine that both your transmitter and the target receiver are pre-programmed to look first at slice thirty-seven, then at slice sixty-two, then at slice fifteen, then at slice twelve—and to hold the slices in a delay circuit with a 100-slice capacity, until the microchip "tray" has been filled with all 100-slices—at which time another circuit picks them out and presents them to the audio output in the proper sequence: slice one, followed by slice two, followed by slice three... etc. Handled by computer chips, it's child's play! The complete signal is received a mere half-second late, by which time the tray is electronically emptied, and the next half-second of the message has begun to fill it in the same pre-programmed sequence.

This seems to be what we're hearing. Sometimes, this "slicing" is coupled with a familiar pitch-inversion scrambler (such as your local police may use when they don't want you to know that a squad car is being dispatched to the drugstore to pick up a carton of cigarettes for the dispatcher!), for double security. (An excellent discussion of these and other kinds of scrambling can be found in Lee Lapin's "Secrets of Scramblers," POP'COMM, July, 1983, p. 16).

All we can tell for sure is that someone in Central America has a vested interest in not being understood by the wrong parties! But there's more of this to come... and worse...
30.31, 30.35, 30.39: Carriers with guard tones (high-pitched whistles similar to what you hear on an unused auto telephone channel) were noted. All three suddenly left the air together. The purpose and interrelationship of these three is unknown, but they were heard simultaneously with the reception of other military traffic.

30.40: Intermittent guard tone, broken by clear voice and SSB communications. U.S. military origination. This was a semi-duplex operation; the other side of the conversation was noted on 30.20 with no guard tone, and 100% SSB. This arrangement allowed one person to use SSB while the other used clear voice. Simplex operation on 30.40 has also been noted.

30.20, 30.35, 30.55, 32.00, 32.25, 32.35: Guard tone channels (continuous carrier) with occasional clear voice communications. U.S. military origination.

30.05, 30.40, 30.85, 30.95, 31.93, 31.96, 31.98, 32.00, 32.60: And now the plot really thickens! We have just heard the future of "secure" communications, and it is...NOISE! Welcome to the maddening world of the dreaded "DVP"—or Digital Voice Processing!

We've already described the time division mode of scrambling in which a voice is sliced up into pieces a few milliseconds long, and re-assembled in a different order. Now imagine, if you can, that instead of being sliced into milliseconds, a voice is actually atomized into tiny, instantaneous bits a mere hundred-thousandth of a second long; and that each bit is assigned a random position in a complex chain; and that only tiny matching microcomputers inside the transmitter and receiver know the codes that allow them

to re-assemble these bits in the proper order, making audio sense out of what sounds to an ordinary radio receiver like electronic nuclear rubble!

Crack the codes? No chance—unless you have an electronics lab at your disposal, and a powerful computer fully dedicated to a long, painstaking analysis. Even then the outcome would be doubtful.

So how widespread is this awful stuff? All of the frequencies listed above have been noted carrying DVP-type scrambling. You'll know it when you hear it: one short burst of a single, continuous tone, followed by a "roaring" noise very similar to the sound of an open squelch on an FM receiver. The burst of static, or roaring noise, is actually

the human voice of other data in its atomized form. (The tone-burst tells the computer where in the sequence to start looking for the first bit of information, and it then continues looking in a pre-determined order, known only to the logic program shared by the conspiring microchips in the transmitter and receiver!)

Our very own FBI and Secret Service have been experimenting with DVP—with unsettled results. Some agents have been heard to give up in utter frustration and return to normal-voice mode when they couldn't get their expensive, gizmo-laden high-tech radios to work! Running DVP through a repeater evidently does horrible things to the integrity of the ultra-fine bits of

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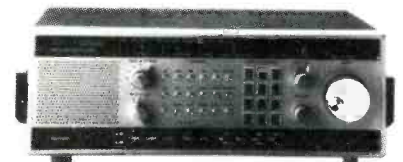
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data, often rendering this high-priced security system completely worthless. Clearly, the kinks are still being worked out of the DVP mode.

So what does this have to do with Central America? Let's come in for a closer look:

31.42: DVP-type scrambling—low power

31.43: DVP-type scrambling—low power

31.44: DVP-type scrambling—medium power

31.45: DVP-type scrambling—low power

31.46: DVP-type scrambling—medium power

31.47: DVP-type scrambling—low power

31.49: clear voice English—medium power

What we have here is a system known as a communications *trunk*: a multi-channel network which may be providing flexible, high-capacity point-to-point communications between two fixed locations, or which may be linking various widely-scattered bases together in a single unified system. Our tip-off as to the location of the trunk comes when we note that clear-voice Spanish military communications are sometimes heard on the 31.45 channel—in the midst of the DVP transmissions! Another interesting characteristic of this system is that the channels 31.44 and 31.46 are usually, but not always, keyed simultaneously. Place of origin is not known at this time—but the Spanish voice coms make Central America the main contender.

31.90 to 32.00: Yet another trunk with similar channel spacing and operating characteristics—also in DVP—can be heard between 31.90 and 32.00 MHz. On 32.00, we find a continuous carrier with a high-pitched guard tone. This channel features occasional DVP-type scrambling, alternating with normal voice communications that are clearly U.S. military in origin. Guard tones are very popular on military circuits. The Russian military likes them too, as we discovered one morning in October of 1978, when this band cracked wide open to the Soviet Union, and their tactical military communications suddenly started pouring in on household scanners all over the eastern United States!

It oftens pays to monitor these seemingly dead carriers. You literally never know what's going to turn up! One of the truly classic examples is the following listing:

32.60: This "dead carrier" channel was monitored for half an hour with no signs of life. Suddenly, and without warning, four voices (at least one of them female) appeared and took turns reading from a script which sounded like something straight out of the Twilight Zone!!! The phrase, "Would you record—now?" was repeated over and over in an almost robotic, emotionless drone, with the blank space being filled by a different one-syllable word as each voice took its turn: "Would you record *mode* now?" "Would you record *page* now?" "Would you record *rape* now?" "Would you record *jay* now?" "Would you record *snipes* now?" "Would you record *chord* now?" "Would you record *maze* now?" "Would

you record *void* now?" "Would you record *flight* now?" "Would you record *scrub* now?" "Would you record *earth* now?" "Would you record *force* now?" "Would you record *hurt* now?"

After the phrase "hurt now," this channel went silent again, and remained silent for the half-hour during which the monitoring continued.

Bizarre? Creepy? Spooky? You betcha! I STILL get the willies listening to these droning, android voices on our reference tape!

A knowledgeable source indicates that similar transmissions have been monitored in the 300 MHz military aircraft band (just now becoming available to scanner owners through the latest generation of expanded-coverage radios), where they have been linked to AWACS radar-intercept training exercises originating at various U.S. air bases. Anyone having a solid explanation for this somewhat frightening catch, please contact the authors!

30.40 (repeater output), 30.80, 31.30, 31.40, 33.65, 34.10, 37.75 (repeater output): Military operations in former Dutch protectorates, Caribbean region. Most of this activity is believed to originate in Surinam. Following a period of independence from the Netherlands, Surinam suffered a bloody military coup in February of 1982, when the National Military Council took control of the government—assassinating the prime minister, along with many of the tiny country's leading writers, physicians, professors, intellectuals and other "elite" professionals, just for good measure.

A conversation monitored on 37.75 at the time of the coup indicated that sporadic fighting was still going on, and that a helicopter was needed to evacuate wounded in the midst of heavy gunfire. These were *not* war games!

Communications from Surinam are readily identified by this nation's curious dialect—a frothy brew of pidgin Dutch, English, Spanish, French, Indonesian, Hindi, and possibly Hebrew! It's fascinating to listen to these people talk. A lot can be understood, and they often switch to straight (in fact, very clipped, proper, uppercrust, British-sounding) English. Here's what a request for a helicopter ("Buzzard") sounded like on 33.65 MHz:

Base: Zero reference your last send, over.

Kilo 26: Heliquet for Buzzard, over.

Base: Zero Roger, over.

Kilo 26: Alpha Tusk Resub Bravo. Load 21 times 5 days resub. Register so far, over?

Base: Zero Roger, over.

Kilo 26: Charlie, pick up Papa Tango Gulf 600 and Delta Papa Tango Gulf 870, over. ("Kilo" designators are used by coastal fleet vessels.)

Another "Heliquet" episode on 37.75 had a certain off-the-wall humor about it—unless it was your life that was at stake, I suppose! Here we had the spectacle of the base controller arguing with a field officer about the proper procedure to be followed, and necessary paperwork to be completed, before a helicopter could be dispatched to

evacuate wounded men from combat!!! Their argument centered on the question of whether the need to evacuate took priority over the completion of a formal request through proper bureaucratic channels! (I'm just glad I wasn't the poor guy who lay there bleeding while his superiors duked it out over the radio!) The impersonal, clipped, highly proper accents of the participants made this ridiculous exchange sound like some wacko Monty Python comedy skit!—though a rather grim comedy indeed. I had a mental picture of men lying in blood on the ground, while some very out-to-lunch officers sipped their chutney and debated the fine points of the application of the operations handbook!

32.25: The 10th U.S. Corps, 23rd Armament Division, motorized rifle regiment was engaged in war games against the "Transnovian" Army! (Hey...weren't they fighting the *Fredonians* in one of those great old Marx Brothers movies?)

32.30: Brazilian military. Portuguese language tactical communications heard. Low band military skip from this country is relatively rare, though whether from propagation difficulties or simply from sparse use of these frequencies in Brazil is not clear.

32.25, 32.45, 36.55, 40.80, 41.10, 41.90: U.S. Navy operations, Puerto Rico. Military frequencies in Puerto Rico and the U.S. Virgin Islands follow the same allocation chart as the continental United States. Propagation from the Caribbean to the mainland is generally outstanding year-round, making these operations very easy and common catches.

33.05: Chemical warfare exercises. One participant stated there was still an indication of "nerve toxins." We hope he was referring to dummy tracer gases. It's against international conventions to use the real stuff. (But this is a good illustration of the way in which potentially serious and newsworthy information can turn up on your scanner: What if they were using the real stuff? They're using it in the Middle East!

33.10: Communications from U.S. Navy ships anchored off the coast of Central America. The 62,000-ton aircraft carrier *Coral Sea* and several other vessels were stationed east and west of Central America at this time, to discourage Nicaragua from retaliation against Honduras for harboring contras.

33.35 (repeater output): U.S. war games in Central America. This repeater was being used to amplify and relay infantry communications from the field.

34.10, 36.35, 36.85: U.S. Air Force operations, Puerto Rico. (See notes under U.S. Navy, above.)

36.87 (repeater output)

33.87 (input for 36.87)

36.90 (repeater output)

33.90 (input for 36.90)

36.97 (repeater output)

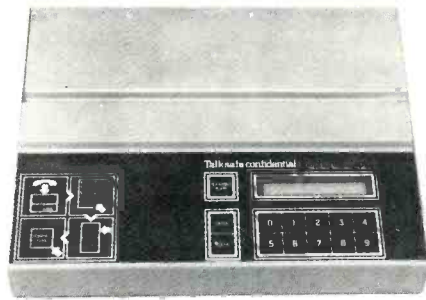
33.97 (input for 36.97)

These three repeaters are a real mystery. They appear to sit idle, waiting for...what? The only reason they were discovered is that

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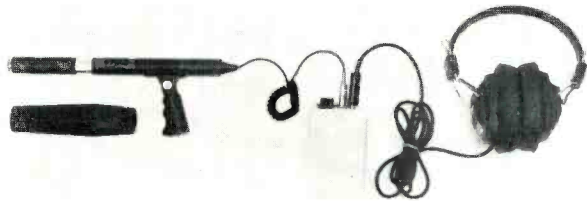
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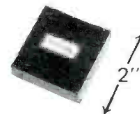


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fire service skip signals from all over the United States are occasionally rebroadcast over them. The U.S. fire frequency 33.90 is a perfect match for the 36.90 repeater, and is therefore relayed loud and clear. But the 33.87 and 33.97 inputs are 10 kHz off from U.S. allocations, so a bit of distortion occurs.

Based on propagation patterns and the fact that fire traffic from all parts of the continental U.S. is being repeated, it is thought that these machines are located on the northern coast of South America. One source claims that they are owned by oil companies in Venezuela. It's equally possible that they are maintained by government or military interests—for what profit-making business would find it economically advantageous to let three repeaters sit idle?

In any event, the make for a fascinating "watch" since they're clearly in a state of readiness and could suddenly become very active. It's a real object lesson in the sometimes bizarre interdependency of planetary communications systems as well: rural fire departments in Maine being heard (without their slightest knowledge or inkling) clear across the continent, and on another frequency altogether, through the maverick antics of one very bored repeater somewhere in South America! What would Marshall McLuhan have said!

36.87, 45.44: Certainly one of the hottest of all DX catches. Time division scrambling, used simultaneously with frequency inversion (pitch) scrambling, to produce a very high-security field radio system. All evidence points to Nicaraguan contras engaged in their guerrilla war against the Sandinista government of Nicaragua (ref. Tom Kneitel's "Nicaraguan Rebels Use Yank Radios," *POP'COMM*, September, 1983).

According to Kneitel's report: "A reader in Honduras...reports that 45.44 MHz has been a popular contra frequency; transmissions monitored include some using a voice scrambler."

More than a year earlier, on June 25, 1982, during a period of intense sporadic E propagation, mysterious transmissions were heard on 45.44 MHz in Southern Illinois.

The transmissions—eerily garbled and vaguely ominous—caused some consternation to at least one local dispatcher of the Southern Illinois Emergency Services and Disaster Agency, also operating on 45.44! He must have thought an alien invasion was in progress!!!

During one series of transmissions on 45.44, the "alien" radio operator switched to clear voice mode, and urged repeatedly in Spanish, "Basa, Basa Cielo: guarocoa!" This has been translated by a Spanish-speaking monitor as, approximately: "Base, Sky Base: shelter! (or, "Take shelter"). At the time of monitoring, the existence of such high-tech scrambler radios in the hands of the Nicaraguan contras, and their use of 45.44, were completely unknown. Kneitel's article finally blew the cover off the operation, and helped to identify a rare and spectacular DX catch indeed!

The contras have recently become notorious for their air strikes on key Nicaraguan industrial and military installations, as well as their air support for invading ground troops. Contra airstrips are located in northern Costa Rica and southern Honduras. The Nicaraguan government has charged that the raids are financed and organized by the Central Intelligence Agency.

At the time of this writing, a rash of "mysterious" U.S. helicopter crashes—all but one of them attributed to non-hostile causes such as "bad weather" and "engine failure"—have resulted in the loss of several American lives. These crashes have occurred along the Honduran/Nicaraguan border, where the contras are most active. The Pentagon hotly denies that it is providing direct air support or cover to the contras.

Keep a close watch on these frequencies! Clearly, not everything worth hearing has yet been consigned to the uncrackable crackle of DVP—though we can expect to hear a lot more of it turning up where such sensitive and covert activities are or may be taking place.

Back On The Home Front

And finally, here are just a few of the state-

side military channels to sharpen your ears for, now that the band is hot with summertime sporadic E! (For more information, refer to Tom Kneitel's *Top Secret Registry of U.S. Government Radio Frequencies*, an outstanding Low Band list!)

30.00: MX Missile Radio Net, Channel 48
32.23: White House to Camp David communications!

34.60: Nellis AFB and Nuclear Testing Range, Nevada (aircraft frequency)

36.05: Shoshone MX Missile Receiving Site Net, Nevada

41.10: White Sands Missile Range Recovery Net, New Mexico

Low Band skip is a vast and kaleidoscopic field of study. Clearly, we've just scratched the surface of the subject—limiting ourselves to one small corner of the world where strange propagation, and stranger political events, are having a daily impact on our lives and our monitoring activities.

Whatever the current name for these "joint military exercises," America looks to have made a long-term commitment to Central America, with over 700 permanent troops assigned to maintain the airstrips, ocean piers, radar stations and other installations built during Big Pine I and II. From the huge U.S. embassy complex in Tegucigalpa, to the anti-guerrilla tactics base at Puerto Castilla, it's clear the Yanks are dug in. And it's clear that Central America will continue to fill your scanner with fascinating skip for months and years to come.

Curiously enough, almost nothing was heard on Low Band relating to the Grenada invasion. Central American war games continued to be heard more or less as usual—along with some powerful stateside military skip from a training base known as "Long Rifle," of which we'll hear lots more in a subsequent article. Perhaps Low Band was avoided during the invasion of Grenada because of its well-known penchant for being heard at great distances, and the fact that the administration was decidedly media-shy during the event.

Before we drop you safe and sound back at your home QTH, we leave you with a very important reminder: While charting our Central American course, even in such a shortened form, we've had to gumshoe our way gingerly around hundreds of bone-crushing signals—from off-shore oil drilling rigs, Jamaican horse-bookies, Trinidadian taxi drivers, even (we kid you not!) the frightfully efficient German Autobahn Police—and more beeps, squeaks, tweets, grunts, groans, squawks, squeals, and buzzes than any mere mortal should ever be forced to endure!

We hope to analyze some of the more humanly inviting of these Low Band skip signals for you in the future. In the meantime—keep your ears on! It's comforting to know that turnabout is fair play, and that you, too, can listen to Big Brother...listening to you!

Check your flack jackets as you deplane, please. And one last request before you go: "Would you record *Orwell* now!!!" **PC**

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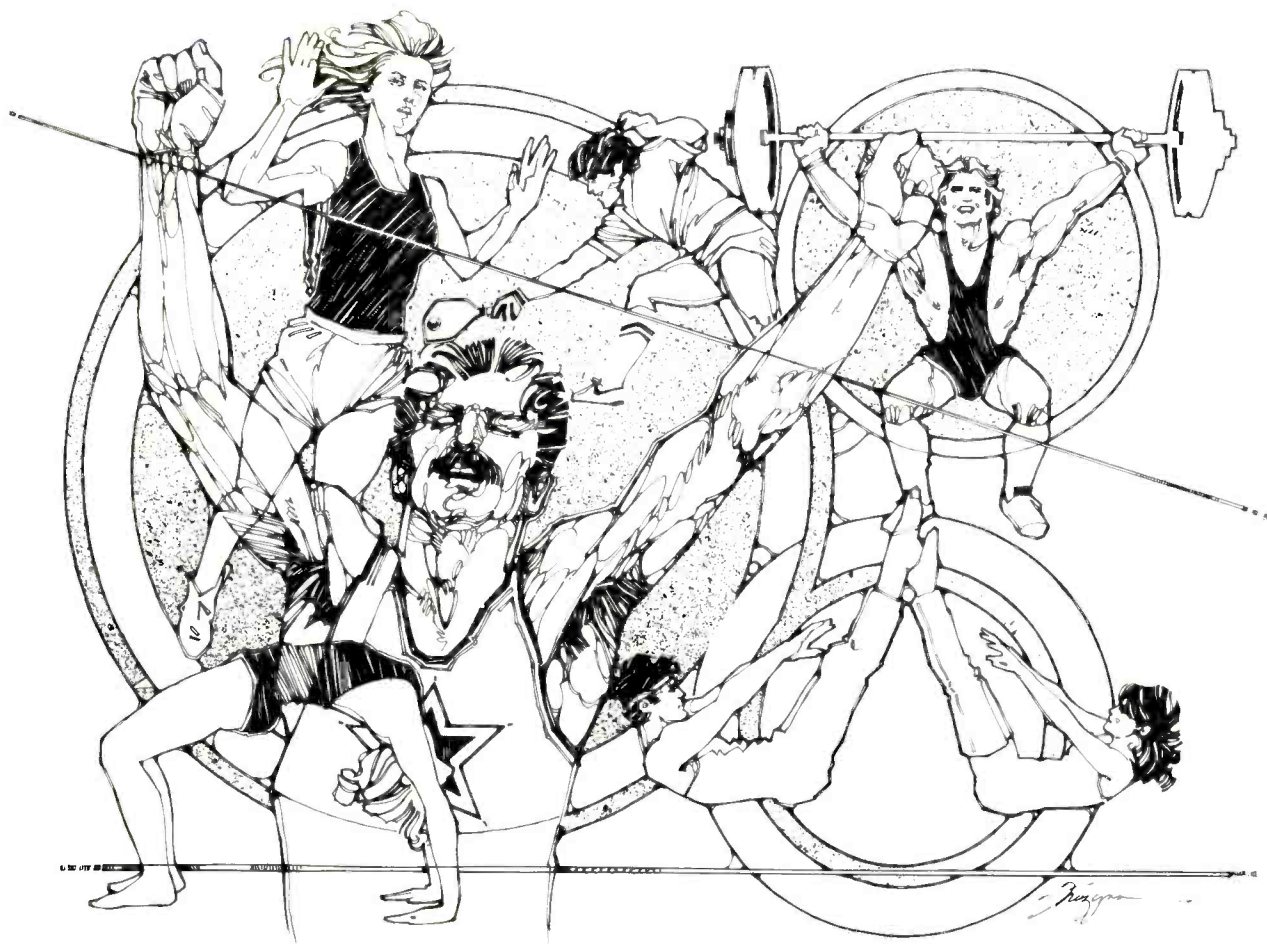




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Scanning In Olympic-Town

**Going To The Olympics This Summer?
Here Are Some Frequencies You May Want To Monitor!**

BY RANDY CANIGLIARO, KCA6UH

For scanner owners, Los Angeles is one of the greatest places in the world. There seems to be more communications activity in the Los Angeles area than just about anywhere else you can think of, so if you're attending the 1984 Summer Olympics, be sure to add to your enjoyment of Los Angeles by bringing along a scanner.

The public safety frequencies will be buzzing away to beat the band. Such frequencies have been available to scanner owners for some time now and if you're in doubt you can check at any communications shop and they'll probably be happy to clue you in. If you're unable to locate a scanner emporium because you're unfamiliar with Los Angeles, check in with Communications Center, 915 North Euclid, Anaheim, CA 92801 as they are a major scanner supplier in Southern California. In fact, Communications Center informs us (as we go to press), of tentative

plans to establish a phone-in scanner frequency service during the Olympic Games. This would be an automatic answering machine which will provide up-to-the-minute Olympic frequency information and also give scanner owners a chance to offer their own discoveries for subsequent updates. The telephone number for this will be (714) 533-INFO—and we assume that if it is put into effect, it will be in use just prior to and during the Olympics. Hope they go ahead with this idea as it's quite clever and useful. See this month's *Scanner Scene* column for more information on Olympic frequencies.

One of the areas of listening you may find interesting during the games is contained in the listings provided in this issue of *POP! COMM*. These listings cover many hotels, airlines, colleges and universities, news media, car rental agencies, etc. This type of frequency information is not usually made

available in published listings but is nonetheless worthy of your monitoring time.

For those of you who like to monitor airport communications, there should be plenty of air traffic control activity to monitor in the Los Angeles area. Listen for the Los Angeles International Airport control tower on 120.95 and 133.9 MHz, with helicopters to be monitored on 123.05 and 119.8 MHz. Ground Control at "LAX" is on 121.65 and 121.75 MHz. The Clearance Delivery channel is 121.4 MHz. The LAX Unicom frequency is 122.95, while the ATIS (Automatic Terminal Information Service) transmissions are on 133.8 and 135.65 MHz. Aircraft approaching the field communicate on 124.5, 124.9, and 128.5 MHz, while those departing operate on 124.3 and 125.2 MHz. The area FAA Flight Service Station operates on 122.2 and 122.5, while 122.0 MHz is used for aviation weather.

The Los Angeles Air Route Traffic Control Center (ID: "Los Angeles Center") controls and monitors aircraft movement in and around the Los Angeles area. You will probably be able to monitor the ground station on several frequencies (depending upon your location, since the "Center" uses many remotely situated transmitters), but you should be able to hear aircraft on most of the following frequencies (all are MHz):

119.0	132.5
121.35	132.6
124.15	132.625
124.2	132.85
124.15	133.05
125.65	133.2
125.8	133.4
125.85	133.55
126.0	134.025
126.35	134.075
126.4	134.4
127.1	134.55
127.35	134.65
127.4	134.75
127.9	135.25
128.05	135.3
128.2	135.45
128.6	135.5
132.15	135.55
132.3	135.575

Also, be sure to search through the 128.8 to 132.0 MHz band for airline communications traffic.

Major News Media Communications Stations Los Angeles Area

American Broadcasting Co.

KAC3137	462.65
KCP989	471.1625
KFY499	463.60
KM8246	173.325 (ABC Sports)
KMJ572	455.05
KRO642	455.75

Columbia Broadcasting System

KST453	31.04
KVD493	450.0875
KZH804	450.05

National Broadcasting Co.

KEH396	450.1875, 450.3875, 455.2875, 455.3975
KES328	161.64, 161.67, 161.70, 161.73, 161.76

Metromedia

KJT464	455.5875
KJT465	161.73, 161.76, 170.15
KMD404	170.15
KMH230	450.05, 450.55, 450.95, 455.25
KMK377	463.60
KMM808	161.73, 161.76, 170.15
KVY938	450.05, 450.55

Associated Press

KFF564	151.625
KTI487	453.00
KV4234	173.225, 173.275, 173.325, 173.375



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R-390A \$225.00

Copy of technical manual for this radio \$15.00

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Shipping wgt. 22 lb. PDR-27 Rad Meter \$50.00

PDR-27 phones \$7.00

Hi Sensitivity GM tube \$10.00

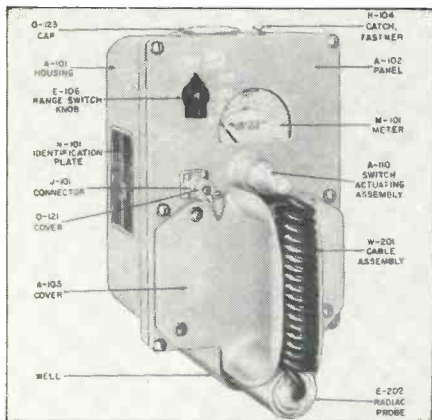
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Low Sensitivity GM tube \$5.00

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Some Los Angeles Frequencies

MHz	Callsign	User
30.80	KAN602	Skyways Airport Hotel
31.04	WXZ853	Quality Inns Int'l.
31.20	KUV225	Foothill Patrol & Alarms
31.24	KRX840	Holmes Guard & Police
35.08	KBG793	Hotel Bel Air
	KFU865	Samuel Goldwyn Productions
	KGG457	Los Angeles Athletic Club
35.10	KBO417	Baker Protective Service
35.94	KCV558	Ramada Inns
46.56	KGR764	Univ. of California
150.905	KMK619	Auto Club of So. Calif.
150.92	KMK619	Auto Club of So. Calif.
150.935	KMK619	Auto Club of So. Calif.
150.95	KMK619	Auto Club of So. Calif.
150.965	KMK619	Auto Club of So. Calif.
151.685	KMK311	Pan American World Airways
	KWP821	Universal Guard & Patrol
151.715	KCI903	Baker Protective Services
	WYM864	Airport Century Inn
151.775	KST628	Security Service System
	KVL225	Trans World Airlines
	WRU250	Calif. Inn Management
151.805	KBR335	Western Airlines
	KDM746	University of So. Calif.
	KYM407	National Patrol & Security
151.955	KLJ496	District Security
	KLZ430	Occidental College
	KZB848	Westwood Hyatt House
152.48	KUG867	University of Calif.
	KWI534	Hyatt Regency House
154.515	KVH803	Holiday Inn Int'l.
	KYM628	Pepperdine University
154.54	WQL417	Sheraton Plaza
154.60	WSX595	New Otani Hotel
154.625	KUH728	East Los Angeles College
158.46	WZG648	Bel Air Sands Hotel
173.225	KMF618	Times Mirror Co.
452.525	KMK619	Auto Club of So. Calif.
452.55	KMK619	Auto Club of So. Calif.
452.575	KMK619	Auto Club of So. Calif.
452.60	KMK619	Auto Club of So. Calif.
453.00	WDE397	Herald Examiner
460.65	KQI455	Pan American World Airways
	WQR786	Golden Gate Airlines
460.675	KLT459	Trans World Airlines
460.70	KQP839	Hughes Air West
	KYP395	Braniff Airlines
	WQJ585	Air California
460.725	KML555	United Airlines
460.75	WRZ759	Western Airlines
460.775	KJD675	American Airlines
460.825	KJE663	Delta Airlines
460.85	KLZ490	Continental Airlines
	WXE946	World Airways
460.875	KLO779	United Airlines
	KVT966	Air France
	KML284	Baker Protective Services
461.25	KMK580	Continental Airlines
461.50	WQT434	Singapore Airlines
	WZT722	Wilshire Hyatt House
461.75	KWP419	Golden West Airlines
462.125	WYH610	Le Park Hotel
462.575	KAC1183	Carson Private Patrol
462.65	KAB0709	China Airlines
462.725	KAB0448	Western Airlines
462.80	KIC587	Century Plaza Hotel
	KSN401	University of Calif.
462.85	WXB251	American Airlines
462.925	WZT728	Ambassador Hotel
463.325	KIV743	Budget Rent A Car
	KWR347	Aztec Rent A Car
463.375	KII847	Payless Rent A Car
	KSN401	University of Calif.
463.525	KWY532	Celebrity Private Car Svc.
464.375	KUE825	University of So. Calif.
	WRS536	Marriott Hotel
464.475	WZX865	Airline Rent A Car
464.525	KAR252	Trans World Airlines
	WQH519	University of So. Calif.
	WSX595	New Otani Hotel
464.575	KRH856	University of So. Calif.
	KUC343	Hertz Systems
	KYC309	Western Airlines
464.675	KQZ410	Pan American World Airways
464.825	WSG391	Alfa United Rent A Car
	WXM802	Times Mirror Corp.
464.85	KUT294	Sheraton Inn
484.875	WRT389	Ramada Inn (Airport)
	WSO377	TransAmerica Airlines
464.925	KRA285	Lufthansa Airlines
464.975	KZC714	Trans Rent A Car



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165 Fantastic Frequencies!

There's Never A Dull Moment On These Frequencies. Maybe You Should Check Them Out.

BY ALICE BRANNIGAN

Ever sit by the ol' receiver wondering what to listen for? Radio Moscow is rattling on with one of their boring dissertations on their latest "Five Year Plan." The ham bands are loaded with loud locals. What with one thing or another, there just isn't anything that catches your interest. It's like standing there with the refrigerator door open and not being able to locate anything you really want to eat, despite a spectacular assortment of cold-cuts and leftovers. You know that feeling? Well, here's instant aid.

We have put together an assortment of all sorts of interesting communications frequencies that can usually be relied upon to provide that needed pick-me-up for otherwise bored and finicky monitors. From within these 165 frequencies you're guaranteed to find one or more ways to pass a few hours or days interestingly.

These are (unless otherwise noted) all voice frequencies, mostly SSB (upper side-band) and they represent frequencies used predominantly by English language communications networks—military, maritime, aero, and other odds 'n' ends. Although frequencies below 10 MHz are generally used at night and those above 12 MHz are more active during daylight hours, you'll find that

the large networks of stations operating on these frequencies provide listening fare that can be tuned in just about any time you're looking for something different.

By no means does this pretend to be a completely comprehensive listing of each and every such frequency which *might* be listed here, but it does represent what (in my opinion) amounts to the best bets for tuning in on interesting offbeat stations. Of course, some frequencies are seasonal (such as those used by hurricane networks); likewise, some are used only under special circumstances, as in the case of frequencies indicated for search and rescue.

The next time you're in that restless and hard-to-satisfy mood, why not take our listing in hand and sit down at the master console. Tune in the first frequency and start working your way down the list, frequency-by-frequency. Some may leave you unsatisfied, it's true, but others will certainly be just what you're seeking. You can, in fact, check off those that especially appeal to you and go back to them from time to time. If you've got a programmable memory storage on your receiver you might even wish to enter some of these frequencies for quick recall in the future.

The nicest thing about these frequencies is that they are host to large numbers of stations that come and go and present a continually changing panorama of sounds and experiences. You just never know what you're likely to hear!

kHz	Remarks
500	Maritime Calling & Distress (CW only)
530	Low power Traveler's Information Broadcasts
1610	Low power Traveler's Information Broadcasts
2003	Intership (Great Lakes)
2082.5	Intership
2086	Mississippi River
2093	Fishing boats
2096.5	Maritime
2103.5	US Coast Guard
2141	US Coast Guard aero
2142	Intership (Pacific coast)
2182	Maritime Calling & Distress
2203	Intership (Gulf of Mexico)
2214	Maritime
2261	US Coast Guard aero
2300	US Army Engineers
2350	US Army Engineers
2514	Maritime (Great Lakes)
2550	Maritime (Great Lakes)
2582	Maritime (Great Lakes)

kHz	Remarks
2638	Intership
2667	US Coast Guard
2670	US Coast Guard
2716	US Navy (harbor ops)
2738	Intership
2782	Mississippi River
2830	Intership (Gulf of Mexico)
2836	US Navy (harbor ops)
3023	Search & Rescue
3032	USAF Tactical Air Command
3050	US Navy aero
3060	USAF Tactical Air Command
3123	US Coast Guard aero
3208.1	US Coast Guard emergency
4069.2	Mississippi River
4088.4	Mississippi River
4125	Maritime (calling)
4143.6	Maritime
4383.8	Emergency frequency (Alaska)
4385.2	Emergency frequency (Alaska)
4419.4	Maritime (calling)
4495	USAF Strategic Air Command
4572	Oil rigs
4637.5	Oil rigs
4643.6	Oil rigs
4725	USAF Strategic Air Command
4742	USAF Tactical Air Command
4746	USAF air/ground
4850	Coast Guard/Army Engineers
4872	N. American Air Defense (NORAD)
5211	Fed. Emergency Mgt. Agcy.
5400	Army Engineers
5422.5	US Coast Guard
5430	US Navy aero
5589	Miscellaneous air/ground
5680	Search & Rescue
5688	USAF air/ground
5692	USN/Coast Guard aero
5696	USN/Coast Guard aero
5700	USAF Strategic Air Command
5703	USAF Tactical Air Command
5861	Federal Aviation Admin. emergency
6147.5	Mississippi River
6200.8	Mississippi River
6215.5	Maritime (calling)
6218.6	Maritime
6221.6	Maritime
6251.9	Maritime
6381	US Coast Guard aero
6451.9	Mississippi River
6455	Mississippi River
6723	US Navy aero/ships
6727	USAF air/ground
6730	USAF Tactical Air Command
6738	USAF air/ground
6750	USAF air/ground
6753	USAF Tactical Air Command
6761	USAF Strategic Air Command
6870	Federal Aviation Admin.
7507	Hurricane network
7528.6	US Coast Guard emergency
8101	USAF Strategic Air Command
8207.6	Mississippi River
8246	Mississippi River
8257	Maritime (calling)
8291.1	Maritime
8294.2	Maritime
8364	Lifeboats (CW only)
8648	US Coast Guard aero
8780	Mississippi River
8964	USAF air/ground
8967	USAF air/ground
8980	USCG aero
8984	USCG aero
8989	USAF air/ground
8993	USAF air/ground
9014	USAF air/ground
9023	USAF air/ground
9027	USAF Strategic Air Command

kHz	Remarks
9057	USAF Strategic Air Command
9105	Royal Canadian Mounted Police
9125.6	US Coast Guard emergency
9380	Hurricane net
9793	N. American Air Defense (NORAD)
10493	Fed. Emergency Mgt. Agcy.
11179	USAF air/ground
11182	USAF air/ground
11195	USN/Coast Guard aero
11198	USN/Coast Guard aero
11201	USN/Coast Guard aero
11239	USAF air/ground
11243	USAF Strategic Air Command
11246	USAF air/ground
11494	USAF Strategic Air Command
11513.6	US Coast Guard emergency
12216	Fed. Emergency Mgt. Agency
12379	Mississippi River
12429.2	Maritime
12432.3	Maritime
12435.4	Maritime
13158	Mississippi River
13201	USAF air/ground
13204	USAF Tactical Air Command
13210	USAF air/ground
13215	USAF air/ground
13241	USAF Strategic Air Command
13244	USAF air/ground
13254	Canadian military
13260	Hurricane net
13264	Miscellaneous aero
13560	Undercover/Mercenary use
13907	USAF Strategic Air Command

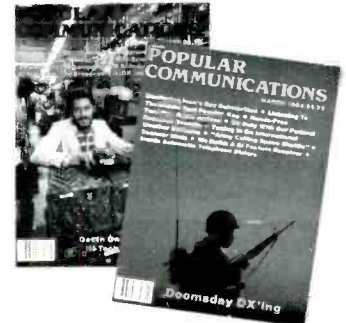
kHz	Remarks
14313	Hurricane net
14325	Hurricane net
14620	Royal Canadian Mounted Police
14955	USAF Strategic Air Command
15015	USAF air/ground
15031	USAF air/ground
15041	USAF Strategic Air Command
15081	USN/Coast Guard aero
15084	US Coast Guard aero
15087	US Coast Guard aero
15087	US Coast Guard aero
15087	US Coast Guard aero
15962	USAF Strategic Air Command
16462	Oil rigs
16488	Mississippi River
16523.4	Maritime (calling)
16587.1	Maritime
16590.2	Maritime
16593.3	Maritime
17283	Mississippi River
17975	USAF Strategic Air Command
18002	USAF air/ground
18019	USAF air/ground
18196.1	US Coast Guard emergency
18594	USAF Strategic Air Command
18721.1	US Coast Guard
20026	Fed. Emergency Mgt. Agency
20631	USAF Strategic Air Command
20890	USAF Strategic Air Command
22124.1	Maritime
22127.1	Maritime
22130.2	Maritime
22133.1	Maritime
22136.3	Maritime
23337	USAF Strategic Air Command

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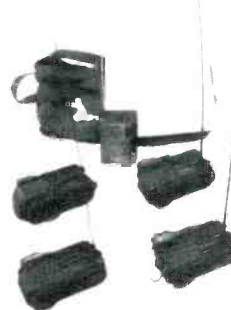
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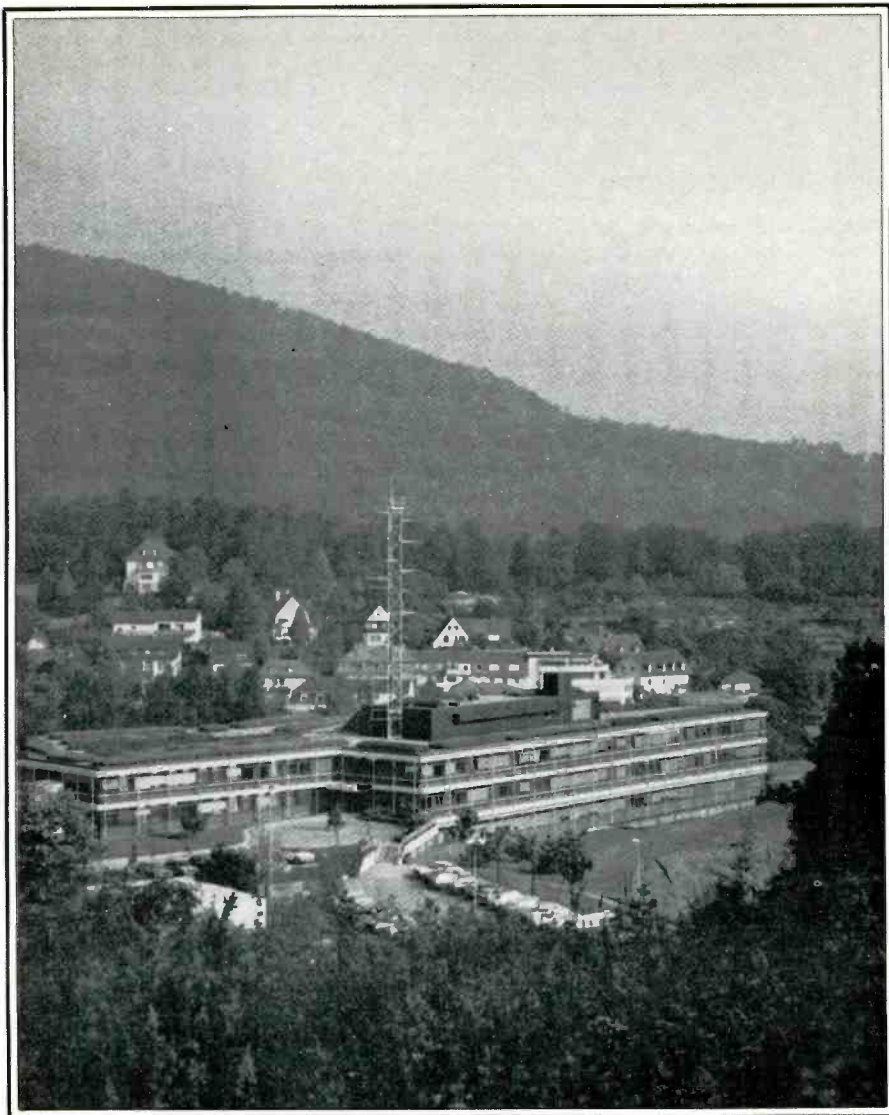
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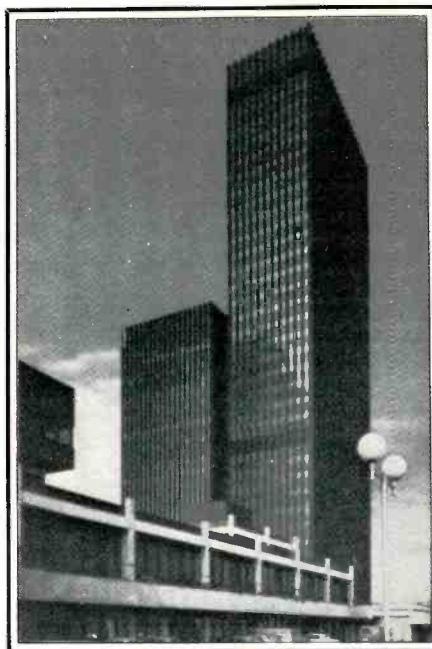
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Deutschland DX

An Inside Look At Broadcasting In Germany (East And West)

BY GERRY L. DEXTER

Over the past three quarters of a century German broadcasting has traveled both high and low roads; high roads of great discoveries, technical and programming achievements, and low roads, that have seen some of the foulest propaganda the world has ever known.

It is difficult to talk about radio today without honoring Henrich Hertz, the German scientist who proved that electromagnetic waves could be sent and received through space, a discovery which took place in 1887. Today, when we talk about "kiloHertz" and "MegaHertz," we salute the man who started it all.

Germany was quick to recognize the potential of being able to send and receive mes-

sages in such a revolutionary manner. As early as 1906 a conference attended by over two dozen nations was held in Germany to assign frequency for radiotelegraphy and set up procedures for its use.

It wasn't long before an arrangement was worked out in Germany through which the Ministry of Posts built and maintained transmitting facilities while programming was provided by privately licensed companies. The first of many such groups was The Radio Hour Company of Berlin, which received a license in 1923.

In 1924 Germany made contact with Argentina over a shortwave transmitter and two years later regular shortwave broadcasting began from a transmitter at Nauen. Soon

other shortwavers were on from Konigs Wusterhausen and Doberitz. A so-called "world broadcasting station" went on the air in 1929.

In 1933 the Third Reich took over all broadcasting operations in Germany and radio became entirely a propaganda tool.

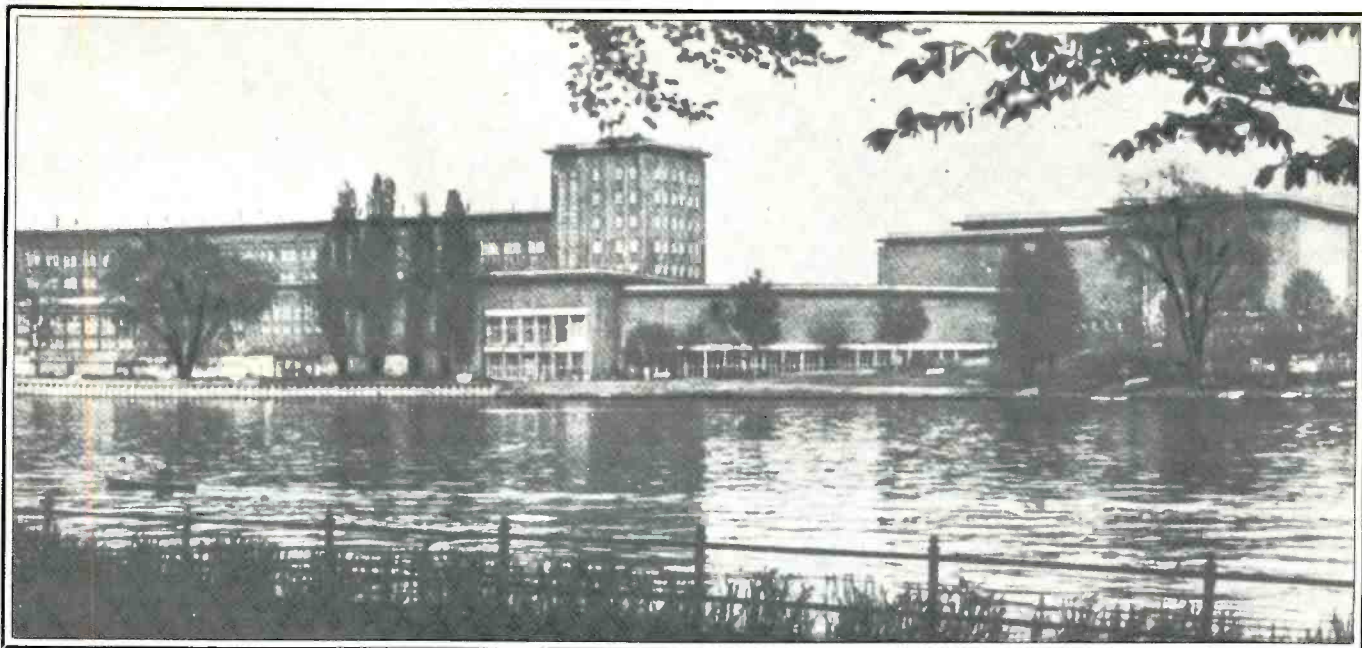
Within three years, there were eight 50 kilowatt units on the air from Zeesen in order to provide coverage worldwide of the Olympic Games in Berlin.

By 1939 when World War II began, the Nazi government had made it illegal for anyone to listen to radio stations from other countries and there were stiff penalties if one was caught with a radio tuned to the wrong frequency!

These were the years when Germany operated many "black" propaganda stations, when "Axis Sally" and "Lord Haw Haw" did their best to disillusion Allied efforts through their radio propaganda.

By 1943 transmitters ranging in power from 50 to 120 kilowatts were on the air from Zeesen, Oebisfeide, Munich-Ismaning, and Elmshorn to feed the Nazi line to the world.

At the end of the war the Allies suspended



Radio Berlin International's headquarters on the river Spree, Berlin.

all shortwave broadcasting from Germany, but only a year or so later, state operation of low-power shortwave was approved by Allied governing bodies. Northwest German Radio was one of the first to resume operations in 1947.

The Allies had insisted that future German broadcasting be set up and controlled in such a way as to be free of all government interference. Studios and transmitter facilities were eventually handed over to newly-created state broadcasting corporations.

The new West German constitution guaranteed freedom of broadcasting but, at the same time, allowed little leeway in private broadcasting efforts.

Stations were to be public corporations charged with the duty of disseminating information objectively, comprehensively, and understandably; to assist in the formation of public opinion by covering public issues, parliament debates, and so on; and to control and criticize by keeping a watchful eye on the operations of government and the various elements making up the private sector of society.

Nonetheless, state broadcasters have great freedom of operation but they are still subject to supervision and control.

Most broadcasters operate under the direction of one or more groups which oversee their activities. These can include an Administrative Council, Broadcasting Council, or other organization made up of members of parliament, church and social leaders, educational and labor figures, and representatives from the world of the arts.

License fees provide much of the income needed for operation of the stations. The average license fee amounts to less than the cost of a subscription to a newspaper. About one-fourth of the fee goes towards operation of the radio facilities.

Many of the stations carry a small amount of advertising as well although most of it is



Disc jockeys at Radio Free Europe/Radio Liberty play Western pop and rock hits for the Russian and East European youth. Hungarian disc jockey Gáza Ekecs is shown here during a "Top Ten" program.

clustered in the prime time morning periods and none is aired on Sundays or holidays.

In West Germany (the Federal Republic), there are nine state broadcasting organizations. Most have at least three program services on radio, as they are involved in producing, programming, and airing television programs as well. A state broadcaster in West Germany thus is a very large concern, with transmitters in many cities throughout the area it is supposed to serve. Any one of these state broadcasters is far, far larger than a major market AM-FM-TV station in the United States.

The state organizations also work together on mutual program projects, exchanging programs and other efforts such as the oper-

ation of a joint computer center, central program library, research and development division, testing and inspection of equipment, and a training division.

Twelve broadcasters are members of ARD (The Association of Public Broadcasting Companies), which concentrates on coordinating efforts and looking out for the interest of the broadcasters.

A few of the West German state broadcasters can be heard via shortwave although the majority of them are lost to us. Either way, here's a rundown:

Bayerischer Rundfunk (BR) Based in Munich, BR began using shortwave in 1949 and has shortwave transmitters at Ismaning, near Munich. There are many other

Bayerischer Rundfunk outlets on FM, AM, and TV in other cities. Shortwave is on 6.085 with ten kilowatts carrying the BR first program from 0430 GMT to a little past 2300. During other hours, programming from the Association of Public Broadcasting Corporations is featured.

Süddeutscher Rundfunk (SDR) South German Radio has a staff of over 1,700 people and operates four radio services and a TV service from its Stuttgart headquarters. Shortwave is aired from 0530 to 2305 on 6.030 with 20 kilowatts from Muhlacker.

Radio Bremen (RB) This station runs a 50 kilowatt shortwave transmitter on 6.190 from 1400 to 1700 Sundays through Fridays and 0800 to 1100 on Saturdays, all featuring the Radio Bremen first program. The station operates three program services for radio, plus television from its Bremen headquarters.

Deutschlandfunk (DLF) This is based in Cologne (Köln), the Federal Republic's capital city. It operates on longwave, medium wave, and FM from several cities and, as part of its service, beams programs to other European countries via its high power medium wave transmitters.

Hessischer Rundfunk (HR) Based in Frankfurt, this state broadcaster has four radio services on AM and FM based in a number of cities. Like Deutschlandfunk, it has no shortwave.

Norddeutscher Rundfunk (NDR) This station has three radio program services beamed over AM and FM outlets in a number of cities, with headquarters in Hamburg. Several years ago it operated on the shortwave frequency of 6.075, but no more.

Saarländischer Rundfunk (SR) From Saarbrücken, this is another state broadcaster which has not added shortwave to its facilities. Its four program services are carried over a multi-city network on both medium wave and FM frequencies.

Südwestfunk (SWF) This is headquartered in Baden-Baden with a staff of nearly 2,000 people. The station uses a 20 kilowatt transmitter at Rohdorf on 7.265 carrying the SWF third program from 0425 (Sundays 0500) to 2300 and the ARD "Nightcap" program during other hours. As with the other state broadcasters, SWF operates AM, FM, and TV stations in a number of cities.

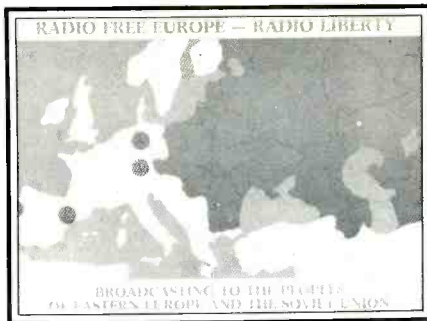
Westdeutscher Rundfunk (WRD) Located in Cologne, this station has four program services on AM and FM from many cities but, again, nothing on shortwave.

Deutsche Welle (DW) The Voice of Germany, charged with the Federal Republic's overseas broadcasting, is the big daddy of German broadcasting.

Deutsche Welle began regular shortwave services some thirty years ago and now operates in 34 languages to all corners of the world.

There are nine 100 kilowatt transmitters located at Jülich near Cologne (Köln) and nine 500 kilowatt units at Wertachtal.

Outside of Germany, DW has two 250 kilowatt transmitters at the Kigali relay station in Rwanda which provide service to Af-



Radio Free Europe/Radio Liberty issues this attractive QSL card.



Monika Kluth and Karlheinz Calenberg, announcers at Radio Bremen.



This huge building houses Sender Freies Berlin and was the first in Europe built especially for radio. SFB's TV station is located in a twenty story building, separate from the radio.

rica. There are two 250 kilowatt transmitters at Sines in Portugal which DW rents from a private corporation and which are used to broadcast to Eastern Europe.

In addition, there is a complex of three 250 kilowatt rigs at Malta to service the Mediterranean, Near East, Far East, and North and South America.

The most recent addition to DW's far-flung relay facilities are the two 250 kilowatt units on the island of Antigua and a 50 kilowatt at Montserrat both in the Caribbean and both operated jointly with the BBC.

Plans are underway to add three 250 kilowatt transmitters on Sri Lanka and this addition will complete DW's powerful line-up.

A major irritant for DXers is the fact that DW will not indicate which transmitter site you've heard when it sends out QSL cards.

The Voice of Germany's huge, two-tower building in Cologne houses some 1,600 staff members. It is also the headquarters for other operations, such as the transcription service which supplies programs to foreign radio and TV stations as well as acts as a training center for journalists and technicians from other countries.

The Voice of Germany is on the air to North America daily from 0100 to 0150 and to the West Coast from 0500 to 0550 GMT.

Not Just For Germans

Broadcasting in Germany is not solely a German monopoly. The United States takes a fair-sized piece of the pie too.

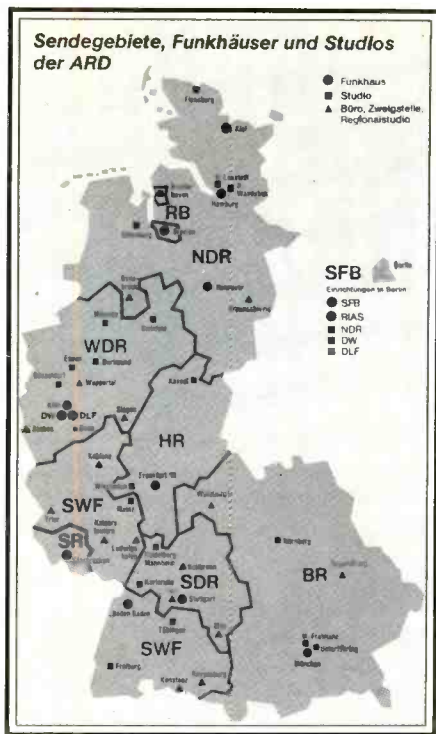
It is estimated that over 25 million people per week in Eastern Europe tune in to Radio Free Europe's many services. Some seven million Russians per week are believed to listen to the broadcasts from Radio Liberty.

Radio Free Europe was founded in 1950, and the Radio Liberty Committee in 1951 (with broadcasts beginning in 1953). Originally, both received most of their operating revenues from the Central Intelligence Agency.

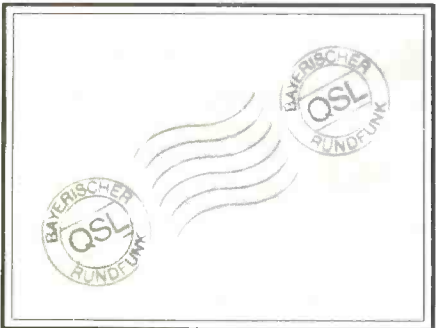
Connections with the CIA were broken in 1971 following the public outcry which greeted revelations that the spy shop had a monetary hand in the stations' operations.

Funding now comes through Congressional grants which are in turn delivered through the United States Board for International Broadcasting. Radio Free Europe and Radio Liberty were combined into a joint operation in 1976.

All RFE/RL transmitters are licensed by the German states from which they operate. There are six transmitters at Bilbis, six at Holzkirchen, and six more at Lampertheim



This map of West Germany shows the operating areas of the state stations.



Bayerischer Rundfunk has issued many distinctive QSLs over the years.

plus other units based at Playa de Plas in Spain and Gloria in Portugal. In all, RFE/RL has access to 46 transmitters.

RFE/RL is charged with the job of encouraging a "constructive dialogue with the people of Eastern Europe and the Soviet Union by enhancing their knowledge of developments in the world at large and in their own countries." Emphasis is upon reporting on events within the target areas and events of interest to people in the target areas.

Radio Liberty broadcasts to Russia in Russian and other languages used in the Soviet Union, while Radio Free Europe beams to the Eastern bloc countries.

The Soviets may quietly tolerate the efforts of such stations as the BBC and Voice of America, but the work of RFE/RL raises red ire. Countless watts, man hours, and rubles are spent in a never-ending effort to jam the broadcasts of RFE/RL. Hundreds of transmitters are involved and according to material issued by RFE/RL, an estimated one hundred million dollars a year is spent on the jamming effort which involves a work force of about 5,000 people!

With all of that money and effort, one might wonder if RFE/RL can be heard at all. The answer to that is a definite "yes." Often as not, RFE/RL transmissions get through. Incidentally, it's not uncommon for people in Russia to leave the large cities on a weekend and drive into the country in order to hear the RFE/RL programs better.

RFE/RL headquarters are in New York City, where the program center sends out some 40 programs per day via satellite or via air shipment. The New York facilities also contain what is said to be the largest collection of material on Russia and Eastern Europe anywhere in the Western World. The collection includes privately circulated "samizdat" publications written by Russians who disagree with their government.

RFE/RL maintains news bureaus in London, Paris, and Rome and, in addition to its large staff of full time employees, has many people doing freelance work.

One of those freelancers was Georgi Markov, the Bulgarian who was the victim of the notorious umbrella murder in London in 1978 (as mentioned in "The Violent World of Shortwave," *POP'COMM*, May, 1984). The murder of Markov is believed to be directly connected to the work he was doing for the broadcasters.

The Voice of America has a relay station in Germany at Munich which features two 100 kilowatt transmitters (made in Czechoslovakia!), plus an 8 kilowatt, one 40 kilowatt unit used for single sideband transmissions, and a 1 kilowatt transmitter for CW transmitting. There's also a longwave transmitter and two medium wave units.

The Munich relay station targets Northern Europe, the USSR, Eastern and Southeastern Europe, the Balkans, the Mid-East, North, East and West Africa along with Spain, France, and Portugal.

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CIRCLE 61 ON READER SERVICE CARD

ent—East Germany. Across the border in the German Democratic Republic, things change considerably. Broadcasting is totally controlled by the state under the GDR State Radio Committee. Everything's done Soviet-style.

There are several home services in East Germany, including the following:

Radio DDR This has two services. DDR-1 featuring news and entertainment on a 24-hour-a-day basis is broadcast over ten medium wave and nine FM transmitters. DDR-2 runs 14 hours a day on thirteen FM transmitters.

Stimme der DDR (Voice of the DDR—Deutschland Demokratischen Republik) It is a 24-hour-a-day home service on one longwave, four AM, ten FM and two shortwave facilities. There is a 50 kilowatt shortwave transmitter at Leipzig and a 5 kilowatt transmitter at Berlin. Leipzig is on 9.730, Berlin on 6.115 and 7.185. These also carry the programs of Radio Berlin International.

Berliner Rundfunk (Berlin Radio) This station encompasses a sizeable list of AM and FM transmitters in Berlin and other East German cities carrying a variety of programming, including the DDR-1 service.

Radio Berlin International (RBI) East Germany's international voice. It began operations in 1955 as the "Foreign Information Department" of GDR Radio. RBI was created under that name in 1959 and now uses 11 languages to Europe, North and Latin America, Southeast Asia, Africa, and the Arab world. RBI puts out some 50 hours of programming per day in various languages.

Transmitter powers range from 5 to 500 kilowatts and are located at Königswusterhausen, Nauen, and Leipzig.

RBI is very big on the QSL scene, offering a total of more than 50 different QSL cards. Their RBI DX Club heavily promotes the sending of reception reports to get all of these cards and will further grace the listener with awards once he's sent enough reports.

Radio Berlin International broadcasts to North America in English from 0015 to 0145 and 0230 to 0315 daily.

Radio Volga This is another of the

broadcasters in East Germany, but don't expect to hear it. It's operated by Soviet forces at Barg. There's only one transmitter, a 200 kilowatt unit on longwave (239 kHz). According to the *World Radio TV Handbook*, the station will not QSL.

The Divided City

In the middle of all this is Berlin, which has its share of broadcasting activity too. We mentioned East German transmitters there, but there are others.

Radio In American Sector (RIAS) This began as a wired radio hook-up in 1946 under American control. Today it operates four FM, three medium wave, and two shortwave transmitters. One of the AM and one of the FM outlets are at Hof, near the East German border. The rest are in Berlin.

The service operates around the clock in German except for a ten minute technical break in the middle of the night.

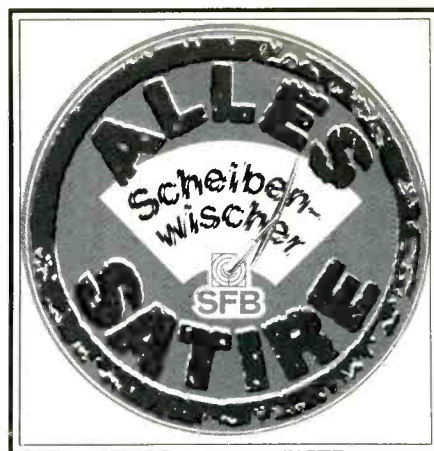
The RIAS-1 service is mostly news and information, while RIAS-2 stresses educational and cultural programs along with lengthy commentaries and analysis. Both services carry some of the other's programming.

Transmissions on shortwave alternate between a transmitter at Munich-Ismaning and the transmitter in Berlin. The Berlin transmitter operates from 0325 to 1730 GMT.

RIAS estimates that as much as 70% of the reachable East German audience listens to the station regularly. About 18,000 letters are received each year from East German listeners.

The success of RIAS can also be seen in the way certain GDR stations slavishly copy the RIAS format.

Sender Freis Berlin (SFB) Radio Free Berlin is another of the official West German state stations, operating three program services plus television. It was founded in 1953 by the Berlin Parliament and has a staff today of just over 1,400. SFB-1 carries a popular/commercial service. SFB-2 caters to young tastes and SFB-3 is the cultural program. SFB-1 is carried over the shortwave facilities of Radio Bremen on 6.190 Sunday through Fridays from 0000 to 1400 and Sat-



If you lived in Berlin you might have this Sender Freies Berlin sticker on your car.

urdays from 0000 to 0800 and 1100 to 2400 GMT.

But still, the German broadcast lineup hasn't been fully surveyed. There are still other stations to be found in West Germany.

Armed Forces Network Europe (AFN)

It is operated by the United States military for its service people. The station headquarters are at Frankfurt and there's a 150 kilowatt longwave transmitter in that city as well as low to medium power AM and FM outlets in several other cities where U.S. military bases are located.

The Canadian Forces Network (CFN)

Based in Cologne and provides a similar service for the Canadian military personnel using a low power FM outlet at Lahr.

Radio Forces Francaises de Berlin

(RFF) Relays Radio France on low power FM in Berlin.

British Forces Broadcasting Service

(BFBS) Provides programming to British military people. Based in Cologne, it feeds mostly low power FM outlets in several cities.

BBC Berlin Relay

This station is also on low power FM frequencies and simply relays the BBC German programs.

Europe Number One

A commercial service based in Saarbrücken with advertising offices in Paris and programming in French. The station uses a mammoth 2,000 kilowatt transmitter on the longwave frequency of 185 kiloHertz.

Even though only a minority of German broadcasters use shortwave, the SWL still has a number of interesting things to try to hear. While Deutsche Welle, Radio Berlin International and, to a slightly lesser extent, Radio Free Europe/Radio Liberty are easy to hear, RIAS and the state stations offer a greater challenge to the DXer.

Once logged, you can be pretty certain of getting a nice QSL—something the German broadcasters are noted (and thanked) for.

Broadcasting in Germany, both East and West, is a mixed bag of programming styles and aims, including a heavy dose of propaganda. Germany is one of those places on the globe where East faces off against West and you can hear it for yourself on your shortwave receiver.

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5.985-RFE/RL	7.275-DW	11.835-RL	17.725-RFE/RL
5.995-DW	7.285-DW	11.840-RBI	17.735-RFE
6.000-DW	7.295-DW, RL	11.855-DW, RFE/RL, VOA	17.750-RL
6.005-RIAS	7.300-RBI	11.865-DW	17.755-RBI
6.010-RBI	9.500-RBI	11.875-RFE/RL	17.760-RL
6.025-DW	9.505-RFE/RL	11.885-RL	17.765-DW
6.030-SDR	9.510-DW	11.890-RBI	17.770-RFE/RL
6.040-DW, RBI	9.520-RL	11.985-RFE/RL	17.775-DW
6.065-DW	9.540-RL	11.905-DW	17.780-DW
6.070-RFE	9.545-DW	11.915-DW, RL	17.795-DW
6.075-DW	9.555-RL	11.920-RL, RBI	17.800-DW
6.080-RBI	9.560-RBI	11.925-RFE/RL	17.805-RFE
6.085-BR, DW, VOA	9.565-RFE/RL, DW	11.935-DW, RFE/RL	17.810-DW
6.090-VOA	9.575-DW	11.960-RBI, VOA	17.820-RL
6.095-RL	9.585-DW	11.965-DW	17.825-DW
6.100-DW	9.595-RFE	11.970-RL	17.830-RBI
6.105-RFE/RL	9.600-RBI	11.975-RBI	17.835-RFE
6.115-RFE/RL, RBI	9.605-DW	15.105-DW	17.845-DW, RL
6.120-DW	9.610-DW	15.115-RFE	17.850-DW
6.125-RBI	9.615-DW	15.120-DW	17.860-DW
6.130-DW	9.620-RBI	15.125-RFE, RBI	17.865-RFE/RL
6.135-RFE	9.625-DW, RL	15.130-RL, RBI	17.875-DW
6.140-DW, VOA, RBI	9.640-DW	15.135-DW	17.880-RBI
6.145-DW	9.650-DW	15.140-RBI	17.885-RL
6.150-VOA	9.660-RL, VOA	15.145-RFE/RL, RBI	17.895-RL
6.155-DW	9.665-RBI	15.150-DW	21.455-RFE/RL
6.160-DW	9.680-RL, DW	15.160-DW	21.465-RBI
6.170-RL	9.690-DW	15.170-RFE/RL, RBI	21.485-RBI
6.185-DW	9.695-RFE	15.185-DW	21.490-DW
6.190-RB, SFB	9.700-DW	15.205-DW	21.500-DW
7.105-DW, VOA	9.705-RFE	15.215-RFE	21.510-RL
7.115-RFE	9.715-DW, RL	15.240-RBI	21.530-RFE
7.130-DW	9.725-RFE/RL	15.245-DW	21.540-RBI, DW
7.145-RFE/RL	9.730-RBI	15.255-RFE, RBI	21.560-DW
7.150-DW	9.735-DW, VOA	15.275-DW	21.656-RFE
7.155-RL	9.750-DW, RL	15.290-RL	21.580-RFE/RL
7.165-RFE	9.765-DW	15.320-DW	21.590-DW
7.175-DW	9.770-DW, RBI	15.340-RFE/RL, RBI	21.600-DW
7.180-RL	11.700-RBI	15.355-RFE/RL, DW	21.650-DW
7.190-RFE/RL	11.705-DW	15.370-RL	21.665-RFE
7.200-RFE	11.715-DW, RFE	15.380-RFE/RL	21.680-DW
7.215-RFE	11.725-RFE/RL	15.390-RBI	21.690-DW
7.220-RL	11.740-VOA	15.405-DW	21.720-RFE
7.225-DW	11.765-DW	15.410-DW	21.735-RFE/RL
7.235-DW	11.770-RFE/RL	15.445-RL	21.745-RFE/RL
7.245-RFE/RL	11.785-DW, RBI	15.450-RBI	25.690-RL
7.255-RFE/RL	11.795-DW, RBI	17.700-RBI	

Where To Write The German Shortwavers

Bayerischer Rundfunk
Rundfunkplatz 1
8000 München 2
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Radio Bremen
Heinrich-Hertz Strasse 13
2800 Bremen 33
FRG

Sender Freies Berlin
Masurenalle 8-14
1000 Berlin 19

Süddeutscher Rundfunk
Neckarstrasse 230
7000 Stuttgart 1
FRG

Südwestfunk
Hans-Bredow Strasse
7570 Baden-Baden
FRG

Deutsche Welle/Voice of Germany
Postfach 1004 44
5000 Köln 1
FRG

RIAS
Kufsteiner Strasse 69
1000 Berlin 62

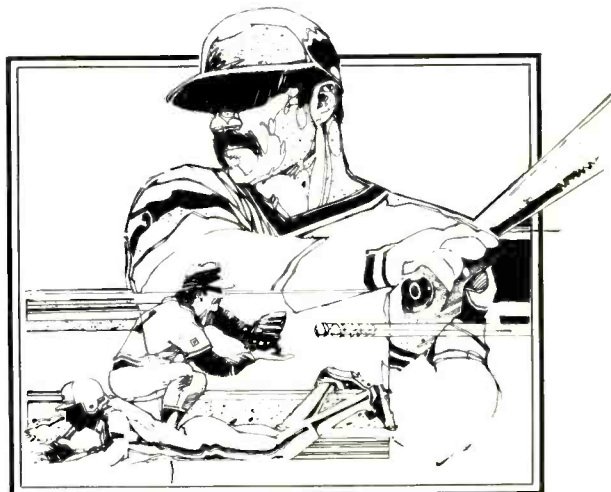
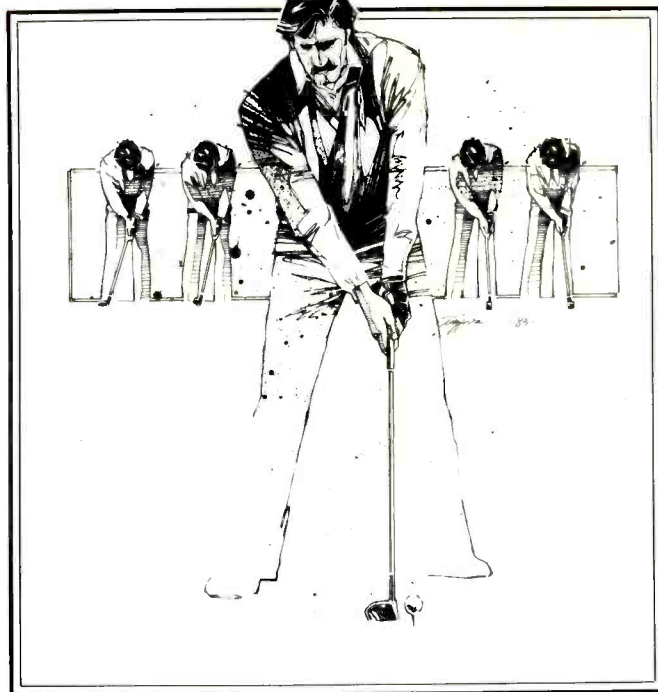
RFE/RL
Oettingenstrasse 67
8000 München 22
FRG

VOA Relay Station
Voice of America
Washington, DC 20547

Radio Berlin International
1160 Berlin
GDR

FRG = Federal Republic of Germany
GDR = German Democratic Republic





Listening In On America At Play!

A Wide Variety Of Outdoor Activities Requires The Use Of Radio Communications – Here's How To Listen In On The Behind-The-Scenes Action!

BY RICK MASLAU, KNY2GL

Back in February of 1983 I offered *POP'COMM* readers a listing of basic frequencies used by professional sports organizations. It was a rather popular topic—folks hereabouts like to follow sports and are interested in knowing what their favorite pro sports teams and participants are up to. Readers submitted lots of additional information relating to listings that I hadn't included. So, what with the time for sports, vacations, and general recreation upon us, it seemed like a good time to gather together what we've gotten thus far and present an updated roundup and recap.

One thing that wasn't included last time was information on straight do-it-yourself recreational activities, things like pleasure boating, for instance. There are many VHF maritime channels, but only some of them are used heavily by pleasure boats. The best bets for listening in on those activities are: 156.45, 156.425, 156.475, 156.525, 156.575, 156.625, and 156.925 MHz. I've always

found that 156.425 is the busiest and most active, however anybody within 25 miles of a navigable body of water (including rivers, large lakes, the Gulf of Mexico, and the oceans) should find activity on all channels to one extent or another. Frequency 156.625 MHz is usually used for coordinating offshore power boat races, as mentioned by reader Jim Hughey of Bronx, New York.

Boats also use the CB frequencies, although different channels seem to apply for each local area. CB is especially popular on small outboard craft that stick close to shore. And don't forget that CB is heavily used by Americans and Canadians for recreational purposes of all kinds. Channel 19 (27.185 MHz) is where to listen for folks in-transit on the highways and byways. Channel 13 (27.115 MHz) has been generally used for RV's and off-the-road vehicle activities, although that channel has no official status for such purposes. Keep in mind, also, that CB may also be used by participants



Small boats are on CB and also the VHF marine channels.



Most motor sports use some form of radio communications.



Air shows and races of all kinds are coordinated by radio.

in motor sports of all kinds, including races.

There has also been a sharp increase in the use of hands-free FM communicators in all sorts of sports and recreational activities on the land, sea, and air. While these devices don't have an especially great range, you should be able to listen in on their communications if you are in the vicinity of their use. Check out the following frequencies: 49.83, 49.845, 49.86, 49.875, and 49.89 MHz.

While professional sports activities may well rely in whole or part upon CB or hands-free FM communicators, a great many pro activities are to be found on VHF or UHF frequencies and operating within the Business Radio Service. Especially active frequencies appear to be 151.625, 154.54, 154.57, and 154.60 MHz; if you're at a pro sports activity with your hand-held scanner and you don't know the frequency in use, try those channels. Communications at sports activities can relate to everything from security to parking, crowd control to medical aid, maintenance, and for conferences between team personnel. As reported by many readers who have attended sports functions with their scanners, it adds a whole new dimension to what's going on out there on the field of action. I've used a scanner to enhance my own enjoyment of football, baseball, and even pro wrestling! A scanner at the 1984 Summer Olympics in Los Angeles should be a boon!

All frequencies shown in our listing are in MHz, and we are still looking for any additional data you may have available to be included in future updates of this data. There are obviously many more sports and recreational activity frequencies in use which didn't make it into this directory, and if you know them, please be sure to pass them along so that we can share them. What about those USFL teams? What about the many motor sports tracks and circuits we didn't get? Pass 'em along and we'll let our readers know! In the meantime, there's enough information here to get you started on listening to America at play. Have fun!

Year 'Round Sports & Recreation Monitoring Guide

Air Shows (various)	122.9, 123.1, 123.3, 123.45, 123.5
Alesi Racing, Lemon Grove, CA	151.625
Amer. Motorcycle Assn.	151.625
Amer. Motorcyclist Assn.	151.925
Aqueduct Racetrack, NY	151.865, 154.60, 464.975
Arlington Stadium, TX	464.875
Atlanta Braves	462.575, 463.325, 467.575
Atlanta Int'l Raceway, GA	154.60
Atlantic City Racing Assn., NJ	158.46
Balloon Media Inc.	151.625
Balloons Aloft	123.3, 123.5
Belmont Park, NY	151.685, 151.835, 464.975
Boston Red Sox	463.325, 464.075
Bristol Int'l Speedway, TN	468.85
Buffalo Bills	154.60, 467.85, 467.90
Caesar's Palace, NV	461.775, 466.775
Calif. Rodeo Inc., Salinas, CA	152.42
Candlestick Park, CA	154.60
Champion Sparkplug Co.	464.55 (at auto races)
Churchill Downs, KY	457.575, 457.60
Cincinnati Reds	462.175, 467.175
Cleveland Indians	154.515
Cleveland Stadium, OH	154.57, 154.60
Craig Road Speedway, Las Vegas, NV	155.28
Dallas Tornado Soccer	464.55
Darlington Raceway, GA	464.50, 469.50
Del Mar Racetrack, CA	151.715, 151.865
Daytona Int'l Speedway, FL	154.515, 154.54, 464.775, 464.90, 469.775
Dover Downs Int'l Speedway, DE	151.895
Dragon's Breath Balloons, CO	151.745
Freedom Hall, Johnson City, TN	154.54
Funks Greyhound Racing Circuit, AZ	151.805
Goodyear Blimps	132.0, 161.64
Green Mtn. Racetrack, VT	154.60

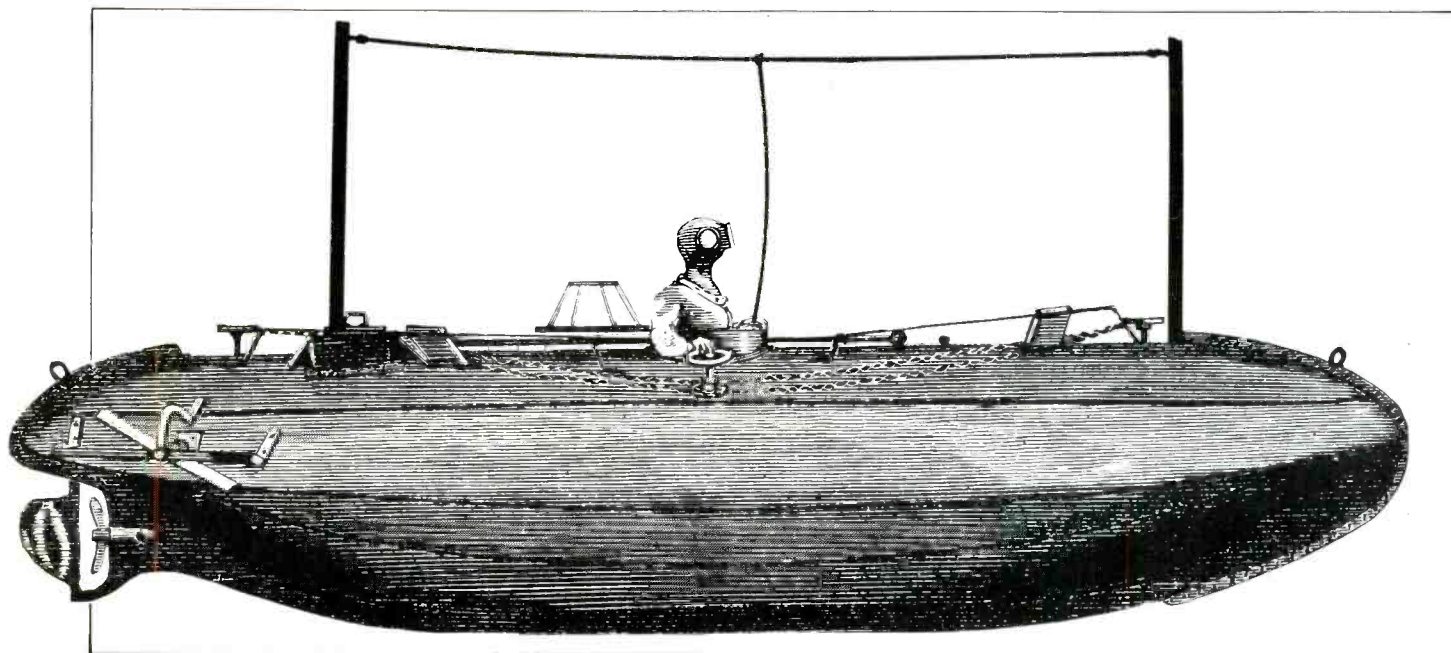
Gulfstream Park, FL	151.805
Hallett Motor Racing Circuit, OK	151.625, 151.925
Hialeah Park, FL	151.865
Hollywood Turf Club, CA	154.57, 154.60
Hot Air Hangups (balloons)	151.625
Hot Air Inc. (balloons)	151.625
Indianapolis Colts	151.715, 154.60
Indianapolis Speedway, IN	154.60
Int'l. Amphitheatre, IL	31.00
Int'l. Motor Sports Assn., CT	154.57
Int'l. Race Drivers Club, WA	154.57
Int'l. Raceways Ltd., WA	151.955
Int'l. Racing Crew Inc., CA	155.22
Kansas City Chiefs	464.775, 469.775
Kansas City Royals	467.825
Keeneland Racetrack, KY	154.60
Kentucky Jockey Club, Florence, KY	461.075
Ladies Pro. Golf Assn.	154.57
Las Vegas Convention Ctr., NV	37.10, 154.74, 465.45
Liberty Bell Racetrack, PA	27.51, 27.53
Lime Rock Race Course, CT	151.985
Little Rock Mun. Auditorium, AR	155.715
Los Angeles Dodgers	154.57
Madison Square Garden, NY	154.60
Market Square Arena, IN	467.80
Martinsville Speedway, VA	154.54
Maryland Jockey Club, MD	151.655
Metro Sports Center, MN	154.57
Miami Dolphins	151.625
Mid-Continent Raceways, NE	151.655
Milwaukee Brewers	151.625, 151.805
Minnesota Vikings	151.955
Monmouth Park, NJ	154.515
Motion Raceway Park, IL	465.80, 465.90
NASCAR races	464.50, 469.50
Nat'l. Air Racing Assn., NV	151.625
Nat'l. Football League	151.625
Nat'l. Golfers of Amer., AZ	154.60
Nat'l. Hot Rod Assn.	151.625, 154.57, 154.60
Nat'l. Rifle Assn.	467.60
New England Patriots	151.625, 154.57
NJ Jets	151.625, 151.835
NY Giants Football	154.54
NY Islanders Hockey	467.90
NY Racing Assn.	151.865, 154.60
NY Rangers	467.75
Oakland Hockey Club	464.50
Old Dominion 100 Mile Track, VA	462.675, 467.675
Olympia Stadium, MI	154.57
Orange Bowl, FL	154.57
Orange Raceway, CA	151.625
Pacific Racing Assn., CA	464.775
Penn Nat'l. Turf Club, PA	154.57
Philadelphia Eagles	151.775
Pimlico Racetrack, MD	464.975
Pittsburgh Steelers	151.625, 464.75
Pocono Speedway, PA	35.18 (wrecker)
Pontiac Stadium, MI	154.515, 462.1625, 462.675, 462.70, 462.75
Power Boat Races (offshore)	156.625
Prof. Golf Assn.	464.55
Prof. Golf Broadcast Assn.	154.57, 154.60
Race Track Security Co.	151.625
Racing Associates Inc., FL	154.60
Reading Stock Cars Inc., PA	151.835
Riverside Int'l. Speedway, CA	154.54
Road America, WI	464.375, 464.525, 469.525
Rockingham Park, NH	151.805
Roosevelt Raceway, NY	42.96, 462.625
St. Louis Football Cardinals	469.50
San Francisco 49'ers	151.775



Hikers and backpackers can be monitored using their 49 MHz hands-free communicators.

San Francisco Giants	151.805
Santa Anita Racetrack, CA	154.57, 158.46, 466.7125, 466.8625, 466.9125
Saratoga Racetrack, NY	464.975
Spectrum Stadium, PA	154.60
Sports Car Club of America	151.625
Sports Car Racing Assn. of Monterey, CA	151.955
Sportsman Park, IL	464.675, 464.925
Talladega Int'l. Speedway, AL	464.775, 469.775
Tampa Bay Buccaneers	151.775
Tampa Bay Soccer Club	151.625, 154.57
Texas Racing Enterprises, LA	464.50
Texas Rangers Baseball	464.5375
Texas Region Sports Center, TX	151.655
Texas Stadium, TX	154.57
The Omni, GA	464.375
Thunder Raceway Unit, ME	154.57
Topps For Crowd Control, CA	151.625
Turf Paradise, AZ	154.54, 154.60
United Racing Club	151.625
U.S. Auto Club	151.625, 151.655
U.S. Olympic Committee	72.78, 457.525, 457.60, 462.625, 467.625, 482-488 band, 500-506 band, 929.7875
Washington Capitals	467.80
Washington Jockey Club, Renton, WA	464.4375, 464.5625, 464.6875, 464.925, 464.975, 464.9875
Watkins Glen Raceway, NY	155.295, 155.34
Wisconsin Auto Racing Inc., WI	151.655
Wisconsin State Fair, WI	154.965
Womens Golf Charities, TX	151.625
Womens Pro. Golf Tour	464.50
Yonkers Raceway, NY	154.54, 154.60, 462.625
York City Auditorium, NE	155.055
York Parachuting Center, PA	468.875

PC



Secrets Of The Silent Service

Those Old Submarines – Untangling Their Radio Callsign Mysteries

BY TOM KNEITEL, K2AES, EDITOR



The USS Grenadier (SS-210) slides into the water for the first time. Two years later she was a war loss and her crew had been taken as prisoners of war.

Just as battleships have always radiated a sense of awe, submarines are surrounded by an aura of mystery and secrecy. Sleek black vessels gliding silently beneath the surface of the world's oceans, their missions have proven invaluable in wartime.

A surface warship, when overtaken or encountered by an enemy, must stand and fight unless it has sufficient speed to get away. A sub need not fight nor show its heels to an enemy ship. It can submerge and attempt to baffle the enemy. Its ability to surprise is one of its most important attributes.

From the first submarine in the modern navy (in 1900) and for the following 55 years (when submarines became nuclear powered), the submarine had not changed markedly—although engines became more reliable, rugged, and quiet, and better greater-capacity storage batteries were installed. Torpedoes were improved in accuracy and run with greater precision. More scientific methods of submersion were achieved and the many instruments and devices used in underwater navigation and target detection became more accurate and reliable. Underwater listening devices in subs were developed to such an extent by WWII that torpedoes could be fired using direction finders without the need to show a periscope.

Submarines have served as mine layers, transports, blockade enforcers, for preparing maps and sea charts, for sabotage and intelligence missions. Their most important function is to intercept a warship or merchant vessel, first using stealth and then invisibility to arrive at a position from which to torpedo a target vessel. That seems simple enough to state, but its accomplishment is far from easy or without considerable risk to the vessel and its officers and crew.

Before nuclear powered submarines, while traveling on the surface, submarines used diesel engines. Underwater propulsion was achieved by large electric motors on the propellor shafts. The diesel engines provided a surface speed of 13 to 20 knots (depending upon the type of submarine), although large fleet subs could travel at about 20 knots in order to accompany larger surface vessels. The underwater speed of the WWII era subs was generally limited to about 20 knots.

American WWII subs ranged in size from the small 800 ton, 253-foot experimental "M" Class vessels (SS-204 and SS-205) to the giant Narwahl Class (SS-166 to SS-168) vessels which displaced 2,730 tons (on the surface of the water, 3,960 tons when submerged) and were about 371 feet in length. Between these extremes were a number of

other classes of submarines used for training, patrol, and fleet purposes—many of which distinguished themselves in battle. The USS *Barb* (SS-220, callsign NAMO) is generally credited with firing the most valuable 6-torpedo salvo in submarine history. That one salvo sank a Japanese escort carrier and a tanker.

The USS *Nautilus* (SS-168/NAJJ) assisted in the kill of the Japanese carrier *Soryu* in June of 1942, and two months later the *Nautilus* and its sister ship, the USS *Argonaut* (SS-166/NICT), landed Marine raiders on Makin in the Gilbert Islands. In the battle of the Philippine Sea (June 1944), the USS *Albacore* (SS-218) and USS *Cavalla*



Twelve German submarines being refueled. Did you know that several U-boats had legit U.S. Navy callsigns? See text.

(SS-244/NBPS) sank the Japanese carriers *Taiho* and *Shokaku* and by doing so terminated the effective use of Japanese carrier aviation for the remainder of the war. Again, in the battle for Leyte Gulf (October 1944), U.S. Navy subs proved their effectiveness—the *USS Dace* (SS-247/NIHC) sank the heavy cruiser *Maya* while the *USS Darter* (SS-227) sank another, the *Atago*. The *Darter* was grounded during this engagement and destroyed by U.S. forces.

The *USS Barb*, mentioned previously, once took part on a bold raid on Japanese soil. Volunteers from the *Barb's* crew paddled ashore in rubber boats to blow up a Japanese train and then, along with other submarines, went on to create havoc and destruction along enemy coastlines by gun and rocket bombardment of ports, refineries, and other targets.

Risky Business

The traditional enemies of submarines are destroyers and destroyer escorts, armed with depth charges and hedgehogs (much smaller but powerful explosive charges dropped in greater number than possible with depth charges). Submarines themselves fought other submarines, hunting them with sonar and sinking them with torpedoes. A total of 23 enemy subs went to the bottom as a result of attacks by American submarines. The *USS Batfish* (SS-310/NYSD) was credited with sinking three enemy submarines in four days.

Because submarines usually operated alone and most attacks on them came when submerged, the sinking of a sub generally resulted in the loss of the entire crew. The *USS Darter*, the *S-27* (SS-132/NINR), *S-36* (SS-141/NIPF), and *S-39* (SS-144/

NIPK) were stranded with all aboard saved. The *USS Sealion* (SS-195/NELQ) was bombed but later destroyed by her own crew with a loss of only five men; the badly damaged *USS Perch* (SS-176/NAKK) had to be abandoned by her crew, who were captured and imprisoned. The *USS Tang* (SS-306) was destroyed by one of her own torpedoes which boomeranged and her survivors were taken prisoners of war by the Japanese. In varying numbers, survivors of the *USS Grenadier* (SS-210/NELD), *USS Sculpin* (SS-191/NELS), *USS Tullibee* (SS-284) and *USS S-44* (SS-155/NIPQ) were also taken as prisoners of war. The U.S. Navy's submarine service lost 374 officers and 3,131 men during WWII. The majority of submarine war losses consisted of vessels that went out to sea and never returned; they were marked "missing" with no further explanation available.

Shrouded In Secrecy

Because of the very nature of their wartime operations, there has never been an abundance of information given out to the public on certain aspects of these vessels. Radio callsigns of American submarines, for example, have followed an interesting evolution over the years, but on one has ever taken the time and trouble to go to the beginning and trace them. I went back to the first submarine of the modern navy and pieced together all of the information I could find up until the end of the diesel submarine era, gathering along the way some interesting

data on various submarines of other nations before and during WWII. It wasn't easy.

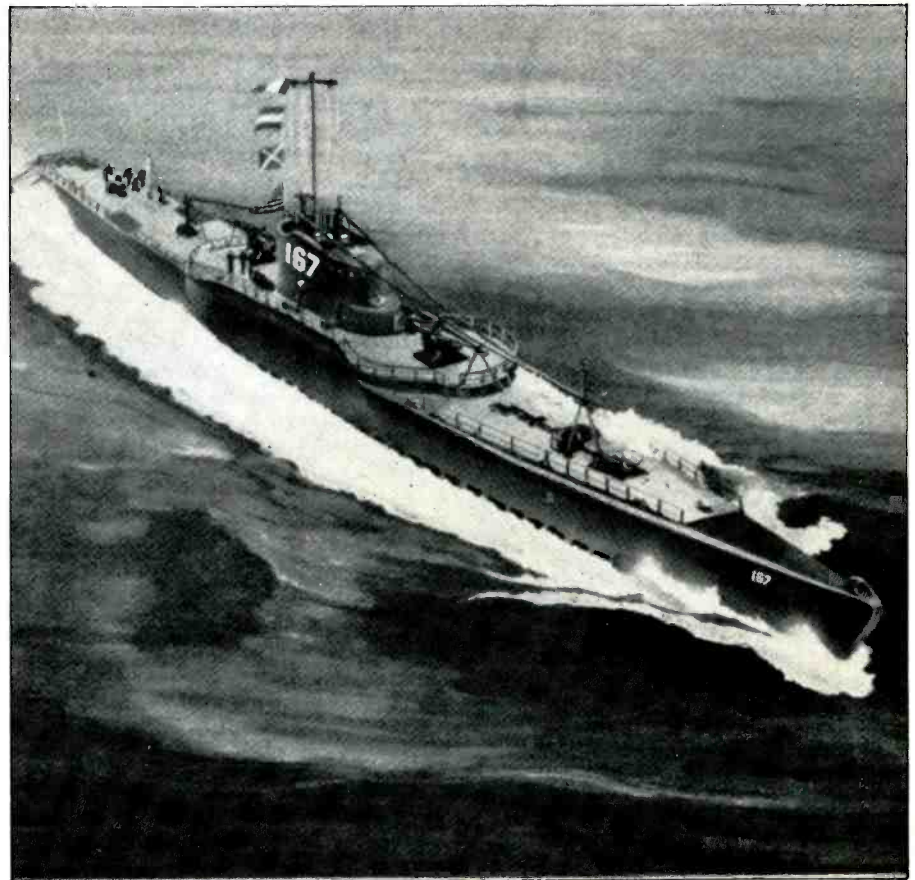
The almost paranoid secrecy surrounding certain information regarding subs was carried to its ultimate by the Soviets in regard to their more than 200 submarines of the WWII era. Throughout the 1930's they had the habit of regularly renaming their subs, but by 1939 they took all of those that had been given names and replaced the names with numbers. Moreover, each time a vessel was transferred from one flotilla to another, its number and radio callsign were changed. As a result, it was impossible to get a fix on which callsign went with which sub, a brilliant security move that has kept the information hidden to this day. The very same Russian submarine might well have had a dozen different names, numbers, and callsigns!

The U.S. Navy's method of handling this was not as deliberately confusing, but it turns out to be nonetheless a rather tangled mess at times.

Every American submarine has been assigned a serial number commencing with the letters "SS" (later nuclear types used the prefix "SSN," or "SSBN" for ballistic missile types) followed by numerals. The first sub of the modern U.S. Navy was the *USS Holland* (SS-1), which was commissioned in 1900. By the end of WWII they had accounted for numbers up to SS-562, although some of those numbers were allocated to subs that were never actually built for one reason or another.

In addition to their "SS" serial numbers,

One of the world's largest submarines, the *USS Narwhal*, had two 6-inch guns and six torpedo tubes.





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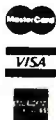
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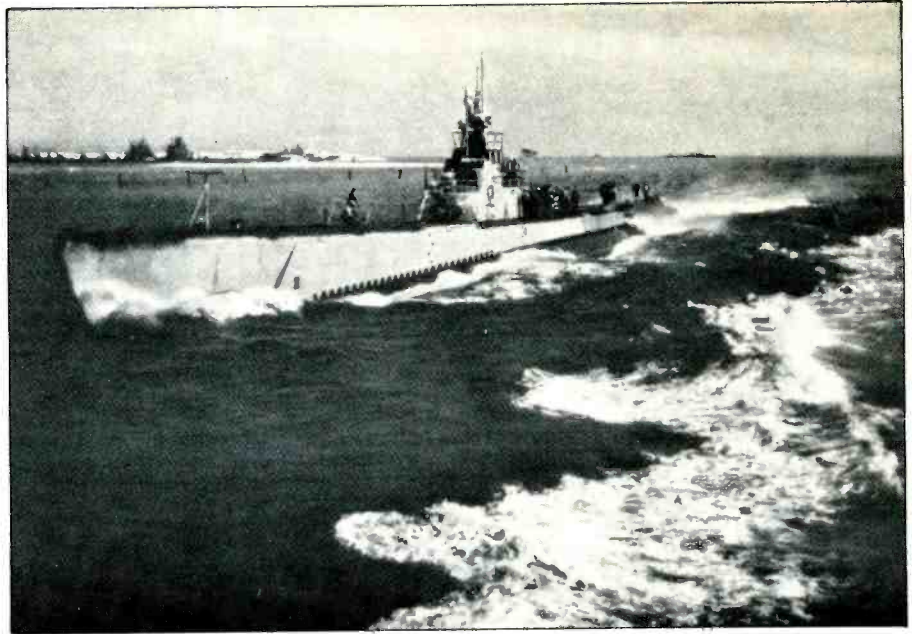
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The USS Spadefish (SS-411) returns from a patrol in 1945. She displays "meatball" flags for each ship sunk and a larger Japanese flag for a carrier bagged on a previous trip. SS-411 was one of nine USN subs that prowled in wolf packs in the Sea of Japan. On the first night she surprised and sank three lighted ships. Later she chased and destroyed 27 trawlers.

The USS Peto (SS-265) sets out in 1945 for a seven week patrol sinking ships, reporting enemy activity, and dodging depth charges.



all early submarines also had actual names, like the USS *Plunger* (SS-2), the USS *Grampus* (SS-3), etc. In November of 1911 it was decided that the names had to go and be replaced by an alpha-numeric designation which indicated the type of class of the vessel concerned. This affected all vessels numbered SS-2 through SS-35. The USS *Plunger* became known as the USS A1, the USS *Grampus* turned into the USS A3, and so on. After WWI the policy had done a flip-flop and all new submarines were again given names, starting with the USS *Barracuda* (SS-163). As before, the names bestowed upon the submarines related to species of fish and more often than not, the initial letter of the name was identical to the class of submarine in which the vessel belonged. For instance, submarines SS-198 to SS-203 were all "T" Class submarines and they were named *Tambor*, *Tautog*, *Thresher*, etc. Naming submarines after species of fish continued into the nuclear powered era but was dropped after SSN-597.

To make matters even more confusing, it should be noted that naval forces of the world usually recycle the names of their warships and the same name may be used and reused many times over the years. By 1939, the British Royal Navy had issued the name HMS *Lively* to no less than 20 fighting ships that had seen action since 1709. By that same year, the name HMS *Swan* had adorned the bows of no less than 24 men-of-war dating back to the year 1420. The U.S. Navy subscribes to this policy and has often given out the same name to many succeeding generations of ships. Within the ranks of subs, as an example, the name USS *Grampus* was used by the SS-3, SS-207, and SS-523 over a period of more than 45 years. There are many examples of this practice and it appears that the submarines planned or built with numbers SS-435 to SS-525 were named after subs lost in WWII.

Submarines commissioned between 1903 and 1917 were given 3-letter callsigns as were assigned all USN ship and shore facilities, although subs had distinctive calls commencing with the letters NX, NY, and NZ. By the end of WWI, however, radio had become so widely used that the Navy was facing a shortage of 3-letter callsign combinations commencing with the letter N. At that time it was decided to issue a new type of 4-letter callsign (beginning with the letter N) to all newly commissioned naval vessels. The first such callsign issued to a submarine was NABB which was assigned to the SS-60, although it was not commissioned for active duty until about 4 years after subs with "later" callsigns.

Like vessel names, the U.S. Navy's callsigns are also recycled from one craft to another. The callsign NEQM at one time belonged to the USS *H4* (SS-147), but only four short years after the *H4* was scrapped, that callsign turned up on the USS *Porpoise* (SS-172). After serving the USS *Aramis* for many years, the callsign NARP was awarded to the sub USS *Stingray* (SS-186) in 1938. After the sub USS *S3* (SS-107) was removed from the active list in 1937, its callsign (NIMK) was assigned to a District Patrol Vessel called the YP-40. Going back 60 years into these 4-letter ship callsigns, you can expect that almost any given callsign combination has been used by many naval vessels.

I've sifted through all of these various complicating factors and have attempted to sort out the relevant submarine names and callsigns. To attempt to clarify the information, I've also included the years of active service, the first date denoting the year the boat was placed in service, and the final date showing when it was stricken from the records. When no final date is given, it indicates that the sub was active at least until the last year (or end) of WWII. Many otherwise

sound subs were scrapped in 1930 and '31 because of international disarmament treaties. Many older subs which served in WWII (such as SS-63, SS-74 and others) had been decommissioned in 1931, but when the war broke out ten years later, these vessels were recommissioned.

Shown in parentheses after the subs' names are any alternate or previous names by which the vessel may have also been known.

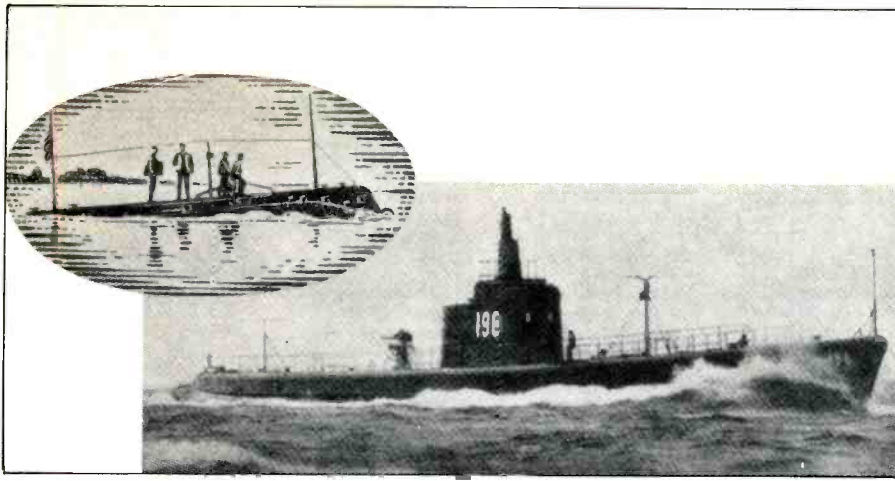
Interestingly, captured Nazi U-boats were assigned U.S. Navy callsigns from the regular series of calls, a fact not generally known.

Performance

During WWII, American submarines sank 1,256 enemy vessels including 167 combatant ships. Fifty-two U.S. submarines were lost during hostilities. Twenty-two had been awarded Presidential Unit Citations up to August 25th, 1945. The several war construction programs included 278 new subs and extended the list to SS-562. Contracts for 110 and authorizations for the final 12 were cancelled as the war began to draw to a close in 1944 and '45. After the war, most of the older types were either scrapped or put up for sale.

Commencing with the USS *Nautilus* (SSN-571) in 1955, the era of the old diesel powered submarines entered a final phase. As new nuclear powered subs were commissioned, one by one, the older subs were retired until eventually they existed only in the dusty archives from which the information here was gathered. So far as is known, no previous attempt to compile and document the callsigns used by the "Silent Service" has been made.

(It should also be noted that in 1958-59, the USN launched three new diesel subs—*Barbel*, *Blueback*, and *Bonefish*, SS-580, SS-581, and SS-582 respectively—which are still in service.)



Inset: The U.S. Navy's first submarine, the famous Holland. She was built in 1897 by the Holland Torpedo Boat Company, direct predecessor of the Electric Boat Company. Photo: The USS Tambor.

SS#	Name (USS)	Call	Dates	Notes	SS#	Name (USS)	Call	Dates	Notes
1	HOLLAND	--	1900-13		66	D5	NAMZ	1918-23	5
2	A1 (PLUNGER)	NXA	1903-13	1	67	D6	NANB	1918-	
3	A2 (ADDER)	NXB	1903-22		68	D7	NANC	1918	
4	A3 (GRAMPUS)	NXC	1903-22		69	D8	NAND	1918	
5	A4 (MOCCASIN)	NXD	1903-22		70	D9	NAGB	1918-41	6
6	A5 (PIKE)	NXE	1903-22		71	O10	NAXT	1918-	
7	A6 (PORPOISE)	NXF	1903-22		72	O11	NETK	1918-	
8	A7 (SHARK)	NXG	1903-22		73	O12	NETL	1918-	
9	C1 (OCTOPUS)	NXK	1908-20		74	O13	NEZN	1918-	
10	B1 (VIPER)	NXH	1907-22		75	O14	NEVD	1918-30	8
11	B2 (CUTTLEFISH)	NXI	1907-22		76	O15	NAXS	1918-30	8
12	B3 (TARANTULA)	NXJ	1907-22		77	O16	NASM	1918-30	8
13	C2 (STINGRAY)	NXL	1909-20		78	R1	NILC	1918-	
14	C3 (TARPON)	NXM	1909-20		79	R2	NILD	1919-	
15	C4 (BONITA)	NXN	1909-20		80	R3	NILF	1919-42	7
16	C5 (SNAPPER)	NXD	1910-20		81	R4	NILG	1919-	
17	D1 (NARWAHL)	NXP	1909-22		82	R5	NILJ	1919-	
18	D2 (GRAYLING)	NXQ	1909-22		83	R6	NILK	1919-	
19	D3 (SALMON)	NXR	1910-22		84	R7	NILL	1919-	
20	F1 (CARP)	NXU	1912-17	2	85	R8	NILM	1919-26	
20	G1 (SEAL)	NXY	1912-21	3	86	R9	NILN	1919-	
21	F2 (BARRACUDA)	NXV	1912-22		87	R10	NILP	1919-	
22	F3 (PICKEREL)	NXW	1912-22		88	R11	NILQ	1919-	
23	F4 (SKATE)	NXX	1913-15	2	89	R12	NILR	1919-43	2
24	E1 (SKIPJACK)	NXS	1912-22		90	R13	NILS	1919-	
25	E2 (STURGEON)	NXT	1912-22		91	R14	NILT	1919-	
26	G4 (THRASHER)	NYB	1914-20		92	R15	NASV	1919-	
27	G2 (TUNA)	NXZ	1913-19		93	R16	NASX	1918-	
28	H1 (SEAWOLF)	NYC	1913-20		94	R17	NAFX	1918-42	7
29	H2 (NAUTILUS)	NYD	1913-20		95	R18	NEGC	1918	
30	H3 (GARFISH)	NYE	1914-30	8	96	R19	NEGK	1918-42	7
31	G3 (TURBOT)	NYA	1915-22		97	R20	NARZ	1918-	
32	K1 (HADDOCK)	NYF	1914-30	8	98	R21	NILV	1919-20	8
33	K2 (CHACHALOT)	NYG	1914-30	8	99	R22	NILX	1919-30	8
34	K3 (ORCA)	NYH	1914-30	8	100	R23	NILZ	1919-30	8
35	K4 (WALRUS)	NYI	1914-30	8	101	R24	NIMB	1919-30	8
36	K5	NYJ	1914-30	8	102	R25	NIMC	1919-30	8
37	K6	NYK	1914-30	8	103	R26	NIMD	1919-30	8
38	K7	NYL	1914-30	8	104	R27	NIMF	1919-30	8
39	K8	NYM	1914-30	8	105	S1	NIMG	1920-42	7
40	L1	NYN	1916-22		106	S2	NIMJ	1920-31	8
41	L2	NYD	1916-20		107	S3	NIMK	1919-37	
42	L3	NYP	1916-20		108	NEFF	(NEVER BUILT)		
43	L4	NYQ	1916-22		109	S4	NIML	1919-26	
44	L5	NYR	1918-25		110	S5	NIMM	1920-21	
45	L6	NYS	1917-25		111	S6	NIMN	1920-37	
46	L7 (AL7)	NYT	1917-25		112	S7	NIMP	1920-37	
47	M1	NYU	1918-22		113	S8	NIMO	1920-37	
48	L8 (AL8)	NYU	1917-25		114	S9	NIMR	1921-37	
49	L9	NYV	1916-30	8	115	S10	NIMS	1922-36	
50	L10	NYW	1916-22		116	S11	NIMT	1923-	
51	L11 (AL11)	NYX	1916-30	8	117	S12	NIMV	1923-	
52	T1 (AA1)	NILB	1920-30	8	118	S13	NIMX	1923-	
53	N1	NZE	1917-30	8	119	S14	NIMZ	1921-	
54	N2	NZF	1917-30	8	120	S15	NINB	1921-	
55	N3	NZG	1917-30	8	121	S16	NINC	1920-	
56	N4	NZH	1918-22		122	S17	NIND	1920-	
57	N5	NZI	1918-22		123	S18	NINF	1920-	
58	N6	NZJ	1918-22		124	S19	NING	1923-36	9
59	N7	NZK	1918-22		125	S20	NINJ	1922-	
60	T2 (AA2)	NABB	1922-30	8	126	S21	NINK	1923-42	7
61	T3 (AA3)	NABZ	1920-30	8	127	S22	NINL	1923-42	7
62	O1	NEXJ	1918-36	4	128	S23	NINM	1923-	
63	O2	NETJ	1918-		129	S24	NINN	1923-42	7
64	O3	NAMR	1918-		130	S25	NINP	1923-42	10
65	O4	NAMX	1918-		131	S26	NINO	1923-42	2

SS#	Name (USS)	Call	Dates	Notes
132	S27	NINR	1924-42	2
133	S28	NINS	1923-44	2
134	S29	NINT	1924-42	7
135	S30	NINV	1923-	11
136	S31	NINX	1923-	
137	S32	NINZ	1923-	
138	S33	NIPB	1922-	
139	S34	NIPC	1923-	
140	S35	NIPD	1923-	
141	S36	NIPF	1923-42	2
142	S37	NIPG	1923-	
143	S38	NIPJ	1923-	
144	S39	NIPK	1923-44	2
145	S40	NIPL	1923-	
146	S41	NIPM	1924-	
147	H4	NEOM	1918-31	8 31
148	H5	NETG	1918-31	8 31
149	H6	NEFC	1918-31	8 31
150	H7	NESJ	1918-31	8 31
151	H8	NELN	1918-31	8 31
152	H9	NEBV	1918-31	8 31
153	S42	NIPN	1924-	
154	S43	NIPP	1924-	
155	S44	NIPQ	1925-44	2
156	S45	NIPR	1925-	
157	S46	NIPS	1925-	
158	S47	NIPT	1925-	
159	S48	NIPV	1922-	
160	S49	NIPX	1922-31	8
161	S50	NIPZ	1922-31	8
162	S51	NIOK	1922-30	8
163	BARRACUDA (B1)	NICQ	1924-45	12
164	BASS (B2)	NICR	1925-45	13
165	BONITA (B3)	NICS	1926-45	14
166	ARGONAUT	NICT	1929-43	2 15
167	NARWAHL (N1)	NEDS	1930-	16
168	NAUTILUS (N2)	NAJJ	1930-	17
169	DOLPHIN (D1)	NICZ	1932-	18
170	CACHALOT (C1)	NIDD	1933-	19
171	CUTTLEFISH (C2)	NIDV	1934-	20
172	PORPOISE (P1)	NEQM	1935-	
173	PIKE (P2)	NENC	1935-	
174	SHARK (P3)	NAZB	1936-42	2
175	TARPON (P4)	NEBF	1936-	
176	PERCH (P5)	NAKK	1937-42	2
177	PICKEREL (P6)	NAQM	1937-43	2
178	PERMIT (P7)	NASD	1937-	21
179	PLUNGER (P8)	NEGL	1936-	
180	POLLACK (P9)	NELF	1937-	
181	POMPANO (P10)	NENO	1937-44	2
182	SALMON (S1)	NAQD	1938-	
183	SEAL (S2)	NAOX	1938-	
184	SKIPJACK (S3)	NARB	1938-	
185	SNAPPER (S4)	NARJ	1938-	
186	STINGRAY (S5)	NARP	1938-	
187	STURGEON (S6)	NARO	1938-	
188	SARGO (S7)	NAKS	1939-	
189	SAURY (S8)	NATU	1939-	
190	SPEARFISH (S9)	NEDF	1939-	
191	SCULPIN (S10)	NELS	1939-43	2
192	SAILFISH (S11)	NIDZ	1939-	22
193	SWORDFISH (S12)	NUDG	1939-45	2
194	SEADRAGON (S13)	NELP	1939-	
195	SEALION (S14)	NELQ	1939-41	2
196	SEARAVEN (S15)	NELT	1939-	
197	SEAWOLF (S16)	NELW	1939-45	2
198	TAMBOR	NAGN	1940-	
199	TAUTOG	NALZ	1940-	
200	THRASHER	NAMF	1940-	
201	TRITON	NAVF	1940-43	2
202	TROUT	NAXC	1940-44	2
203	TUNA	NECG	1941-	
204	MACKEREL	NESL	1941-	23
205	MARLIN	NENV	1941-	23
206	GAR	NEFL	1941-	
207	GRAMPUS		1941-43	2
208	GRAYBACK	NEKF	1941-44	2
209	GRAYLING	NEKM	1941-43	2
210	GRENADIER	NELD	1941-43	2
211	GUDGEON	NELZ	1941-44	2
212	GATO	NECW	1941-	
213	GREENLING	NEGV	1942-	
214	GROUPE	NIDB	1942-68	
215	GROWLER	NOMC	1942-45	2
216	GRUNTON	NUDP	1942-42	2
217	GUARDFISH	NAJH	1942-	
218	ALBACORE		1942-45	2
219	AMBERJACK		1942-43	2
220	BARB	NAMO	1942-54	32
221	BLACKFISH	NAWM	1942-	
222	BLUEFISH	NBAF	1942-59	
223	BONEFISH		1942-45	2
224	CDD	NECO	1943-	
225	CERO	NBMJ	1943-	
226	CORVINA		1943-44	2
227	DARTER		1943-44	2
228	DRUM	NITG	1942-	
229	FLYING FISH	NFAP	1942-58	
230	FINBACK	NIVT	1942-58	

SS#	Name (USS)	Call	Dates	Notes	SS#	Name (USS)	Call	Dates	Notes	SS#	Name (USS)	Call	Dates	Notes
231	HADDOCK	NAEG	1942-		330	BIGALL	NKBN	1944-48	32	430	VANDACE			26
232	HALIBUT		1942-		331	BUGARA	NKBO	1944-71	6	431	WALRUS			26
233	HERRING		1942-44	2	332	BULLHEAD		1944-45	2	432	WHITEFISH			26
234	KINGFISH	NBJC	1942-		333	BUMPER	NJRJ	1944-50	32	433	WHITING			26
235	SHAD	NWDV	1942-		334	CAEZON	NKBZ	1944-		434	WOLFFISH			26
236	SILVERSIDES	NAHZ	1942-		335	DENTUDA	NKFE	1944-		435	CORSAIR	NXWH	1945-	
237	TRIGGER		1942-45	2	336	CAPITAINE	NKCI	1945-66	32	436	UNICORN	NXWP	1945-	
238	WAHOO		1942-43	2	337	CARBONERO	NKCL	1945-70	34	437	WALRUS	NXXB	1945-	
239	WHALE	NITB	1942-		338	CARP	NKCR	1945-71		438	TO 463 (UNNAMED)			26
240	ANGLER	NAHF	1942-71		339	CATFISH	NJRV	1945-71	32	464	CHICOLAR			26
241	BASHAW	NBLJ	1942-69		340	ENTEMEDOR	NKGF	1945-73	32	465	TO 474 (UNNAMED)			26
242	BLUEGILL	NBGL	1942-70	33	341	CHIVO	NKDL	1945-71	32	475	ARGONAUT	NYDH	1945-68	32
243	BREAM	NBAX	1942-69	34	342	CHOPPER	NKDD	1945-		476	RUNNER	NYDR	1945-71	
244	CAVALLA	NBPS	1942-69	35	343	CLAMAGORE	NJDU	1945-75	35	477	CONGER	NYDR	1945-63	
245	COBIA	NBOV	1942-		344	COBBLER	NKED	1945-73	32	478	CUTLASS	NYDT	1945-73	32
246	CROAKER	NFAG	1942-71	35	345	COCHINO	NJEG	1945-49	6	479	DIABLO	NYDW	1945-64	32
247	DACE	NIHC	1942-55	32	346	CORPORAL	NKEM	1945-73	32	480	MEDREGAL	NYEA	1945-70	
248	DORADO		1942-43	2	347	CUBERA	NJSH	1945-72	32	481	REQUIN	NYEC	1945-71	35
249	FLASHER	NIXQ	1942-		348	CUSK	NKEV	1945-69		482	IREX	NYEE	1945-69	
250	FLIER		1942-44	2	349	DIODON	NKFH	1945-71		483	SEA LEOPARD	NYEG	1945-73	
251	FLOUNDER	NIZB	1942-		350	DOG FISH	NJSP	1945-72	32	484	ODAX	NYEI	1945-72	32
252	GABILAN	NFBW	1942-		351	GREENFISH	NJTT	1945-73	32	485	SIRAGO	NYEK	1945-72	
253	GUNNEL	NUJS	1942-		352	HALFBEAK	NKHS	1945-71		486	POMODON	NYEM	1945-70	
254	GURNARD	NFAY	1942-		353	DUGONG (RENUMBERED 435)			24	487	REMORA	NYEO	1945-73	32
255	HADDO	NABN	1942-		354	EEL (RENUMBERED 436)			24	488	SARDA	NYEQ	1945-64	
256	HAKE	NACJ	1942-		355	ESPADA (RENUMBERED 437)			24	489	SPINAX	NYES	1945-69	
257	HARDER		1942-45	2	356	JAWFISH			25	490	VOLADOR	NYEU	1945-72	32
258	HOE	NAZG	1942-		357	ONO			25	491	POMPANO			26
259	JACK	NBPJ	1942-		358	HARLOPPA			25	492	GRAYLING			26
260	LAPON	NBOQ	1943-		359	GARUPPA			25	493	NEEDLEFISH			26
261	MINGO	NAEM	1943-		360	GOLDRING			25	494	SCULPIN			26
262	MUSKALLUNGE	NASO	1943-		361	GOLET		1944-		495	TO 515 (UNNAMED)			26
263	PADDLE	NAQR	1943-		362	GUAVINA	NKHM	1944-67	34	516	WAHOO	NYIT	1945-	
264	PARGO	NATR	1943-		363	GUITARRO	NJHP	1944-54	32	517	TO 521 (UNNAMED)			26
265	PETO	NBDG	1942-		364	HAMMERHEAD	NJTW	1944-54	32	522	AMBERJACK	NYJT	1945-73	32
266	POGY	NEJD	1943-		365	HARDHEAD	NKHY	1944-72	32	523	GRAMPUS	NYKE	1945-72	32
267	POMPON	NEQV	1943-60		366	HAWEKBILL	NKIA	1944-		524	PICKEREL	NYKG	1945-72	32
268	PUFFER	NICD	1943-		367	ICEFISH	NJUN	1944-		525	GRENADIER	NYKI	1945-73	32
269	RASHER	NWBG	1943-71		368	JALLAO	NKIV	1944-74	32	526	DORADO			26
270	RATON	NWDF	1943-69		369	KETE		1944-45	2	527	COMBER			26
271	RAY	NWFB	1943-60		370	KRAKEN	NJUY	1944-		528	SEA PANTHER			26
272	REDFIN	NWGC	1943-70		371	LAGARTO		1944-45	2	529	TIBURON			26
273	ROBALO		1943-44	2	372	LAMPREY	NKJW	1944-		530	TO 562 (UNNAMED)			26
274	ROCK	NWLK	1943-69		373	LIZARDFISH	NKKF	1944-		Captured German U-Boats Given U.S. Navy Callsigns In WWII.				
275	RUNNER		1942-43	2	374	LOGGERHEAD	NKKI	1945-		U-234	NDFL			
276	SAWFISH	NWFM	1942-		375	MACABI	NKKL	1945-		U-505	NQWT			
277	SCAMP		1942-45	2	376	MAPIRO	NKKO	1945-		U-530	NDEJ			
278	SCORPION		1942-45	2	377	MENHADEN	NKLJ	1945-73	34	U-858	NQWU			
279	SNOOK		1942-45	2	378	MERO	NJVP	1945-		U-873	NDFP			
280	STEELHEAD	NBKW	1943-		379	NEEDLEFISH			26	U-977	NDEP			
281	SUNFISH	NENZ	1942-		380	NERKA			26	U-1105	NCHV			
282	TUNNY (SSG-282)	NCDI	1942-69		381	SAND LANCE	NKOM	1943-		U-3008	NDWC			
283	TINDSA	NITU	1943-		382	PICUDA	NJWB	1943-73	32	Notes				
284	TULLIBEE		1943-44	2	383	PAMPANITO	NJVT	1943-		1	MINE LAYER			
285	BALAO	NWPY	1943-63		384	PARCHE	NJVW	1943-		2	WAR LOSS			
286	BILLFISH	NWQV	1943-		385	BANG	NKAM	1943-72	32	3	AFTER LOSS OF F1, SS20 ASSIGNED TO G1			
287	BOWFIN	NWSL	1943-71	35	386	PILOTFISH	NJWG	1943-		4	CONVERTED TO EXPERIMENTAL			
288	CABRILLA	NWXZ	1943-		387	PINTADO	NKMZ	1944-		5	WRECKED			
289	CAPELIN		1943-44	2	388	PIPEFISH	NJWJ	1944-		6	SANK			
290	CISCO		1943-44	2	389	PIRANHA	NJWL	1944-		7	TRANSFERRED TO BRITAIN 1942			
291	CREVALLE	NXDY	1943-68		390	PLAICE	NJWO	1944-		8	DISPOSED OF UNDER TERMS OF DISARMAMENT TREATIES			
292	DEVILFISH	NXFV	1944-		391	POMFRET	NKNL	1944-71	32	9	SCRAPPED			
293	DRAGONET	NXJV	1944-		392	STERLET	NKQL	1944-68	34	10	TRANSFERRED TO POLAND & LATER LOST IN COLLISION			
294	ESCOLAR		1944-45	2	393	QUEENFISH	NKNU	1944-63	34	11	PAID FOR BY PHILIPPINES			
295	HACKLEBACK	NXLL	1944-		394	RAZORBACK	NKNX	1944-70	32	12	FORMERLY B1 V1 & SF4			
296	LANCETFISH	NXMW	1945-		395	REDFISH	NKOA	1944-68	34	13	FORMERLY B2 V2 & SF5			
297	LING	NXND	1945-		396	RONQUIL	NKOD	1944-71	32	14	FORMERLY B3 V3 & SF6			
298	LIONFISH	NXPS	1944-71	35	397	SCABBARDFISH	NKOP	1944-65	32	15	FORMERLY V4 SF7 SM2 & APS1			
299	MANTA	NXSG	1944-67	34	398	SEGUNDO	NKQP	1944-70	34	16	FORMERLY N1 V5 & SC1			
300	MORAY	NXUA	1945-		399	SEA CAT	NKQV	1944-68	34	17	FORMERLY N2 V6 & SC2			
301	RONCADOR	NXWZ	1945-		400	SEA DEVIL	NXOY	1944-64	34	18	FORMERLY D1 V7 & SC3			
302	SABALO	NXYO	1945-71		401	SEA DOG	NKPB	1944-		19	FORMERLY C1 V8 & SC4			
303	SABLEFISH	NYGY	1945-69		402	SEA FOX	NKPE	1944-70	34	20	FORMERLY C2 V9 & SC5			
304	SEAHORSE	NYHD	1943-		403	AUTLE	NJYA	1944-74	32	21	FORMERLY USS PINNA			
305	SKATE	NYIW	1943-		404	SPIKEFISH	NKQC	1944-63	34	22	FORMERLY USS SQUALUS WHICH SANK 5/39 & WAS RAISED THEN RENAMED & RECOMMISSIONED			
306	TANG		1943-45	2	405	SEA OWL	NKPH	1944-69		23	EXPERIMENTAL DESIGN			
307	TILEFISH	NYLP	1944-60	32	406	SEA POACHER	NKPK	1944-74	32	24	PROPOSED AS BALEO CLASS BUT CANCELLED THEN BUILT AS CORSAIR CLASS & GIVEN NEW NAME AND NUMBER			
308	APOGON	NYNX	1943-		407	SEA ROBIN	NKPN	1944-70		25	CONSTRUCTION CANCELLED 1945			
309	ASPRO	NYPM	1943-62	34	408	SENNET	NKPT	1944-68		26	CONSTRUCTION CANCELLED 1944			
310	BATFISH	NYSD	1943-69	35	409	PIPER	NKAD	1944-70		31	BUILT ORIGINALLY FOR USSR			
311	ARCHERFISH	NYUG	1943-69	34	410	THREADFIN	NKSE	1944-73	32	32	TRANSFERRED TO FOREIGN NAVY			
312	BURRFISH	NYVD	1944-61	32	411	SPADEFISH	NKPZ	1944-		33	CUTTLED			
313	PERCH	NZAQ	1944-71		412	TREPANG	NKSZ	1944-		34	EVENTUAL USE AS TARGET			
314	SHARK		1944-45	2	413	SPOT	NKQF	1944-		35	BECAME WAR MEMORIAL (NOTE- THOSE NOT SHOWN WITH FINAL DATE OR DISPOSITION DATA WERE RETIRED & DECOMMISSIONED AFTER WWII)			
315	SEA LION	NZIM	1944-77		415	STICKLEBACK	NKQD	1945-58	6					
316	BARBEL		1944-45	2	416	TIRU	NKSN	1945-75						
317	BARBERO	NZLU	1944-64	34	417	TENCH	NKRY	1944-73						
318	BAYA	NZOV	1944-72		418	THORNBACK	NKSB	1944-72	32					
319	BECUNA	NZQJ	1944-73	35	419	TIGRONE	NKSH	1944-75	34					
320	BERGALL	NZRV	1944-58	32	420	TIRANTE	NKSH	1944-73						
321	BESUGO	NKAR	1944-		421	TRUTTA	NKTF	1944-72	32					
322	BLACKFIN	NKAY	1944-72	34	422	TORO	NKSO	1944-63						
323	CAIMAN	NKCC	1944-72	32	423	TORSK	NKST	1944-72						
324	BLENNY	NKBA	1944-73	34	424	QUILLBACK	NKSW	1944-73						
325	BLOWER	NJRA	1944-50	32	425	TRUMPETFISH	NKTZ	1944-73	32					
326	BLUEBACK	NKBH	1944-48	32	426	TUSK	NKTL	1944-73	32					
327	BOARFISH	NKBK	1944-48	32	427	TURBOT			26					
328	CHARR	NKDC	1944-		428	ULUA			26					
329	CHUB	NJSA	1944-48	32	429	UNICORN			26					

Monitoring Mossad: The Israeli Intelligence Service

**You've Probably Heard These Mystery
"Phonetic Alphabet" Stations And
Wondered About Them!**

BY GREG MITCHELL

The daring exploits of the agents of Mossad have been in the world's headlines for years. The kidnaping of Adolf Eichmann from a street in Argentina is just one of the headlines you probably saw which credited Israel's Intelligence Organization—the very same agency that gathered information sufficient to permit the rescue at Entebbe to successfully take place. The name of the agency may be well known, but its operations are shrouded in secrecy. The radio messages they use to communicate with their agents are in the form of letter codes, actually not at all dissimilar to the numbers code stations which are widely reported by listeners.

Inside Mossad HQ

Far beneath the streets of Tel Aviv lies the control center for civil radio communications, Merkaz Tikshoret. Above ground, it's just a stone's throw from the fashionable shops and restaurants of Dizengoff Street, but the tourists buying souvenirs and eating falafel are totally unaware that the array of microwave and UHF antennas atop a nearby office building are sending messages to high frequency (HF) relay transmitters throughout Israel. Those HF transmitters are heard by Mossad agents in the Middle East and around the world.

About fifteen years ago I was staying in a hotel several miles from Tel Aviv and, as usual, I had taken my shortwave receiver along with me. From out of my window I could see a large collection of HF transmitting antennas and I decided to look for their signals on my receiver. Since I was so close to them it wasn't very difficult to locate the signals—they came blasting through. On up to twenty frequencies, up to twenty different transmissions went out—mostly on the hour and half hour. These transmissions consisted of long lists of letters of the alphabet stated in standard international phonetics (Alfa, Bravo, Charlie, etc.). The announcers were female and had the distinctive accents noted in the nation.

I thought the transmissions were military in origin. I was wrong. Several years of research revealed some of the mysteries of these communications. At this point, most of the women who served as announcers



You never know where a back road will lead in Israel, possibly right to a Mossad transmitting site.

are out of jobs inasmuch as they have been replaced by an automated machine using tape cartridges.

The purpose of the messages is manifold, including civil defense within Israel, diplomatic traffic, as well as for communications with Israel's intelligence gathering organizations. There are several organizations which cover different security areas.

Within Israel and the occupied territories, the General Security Service (Sherut Bitakhon—usually called Shabak) handles counterintelligence activities. A sister organization, Sherut Bitakhon (better known as Shin Bet) tends to other security matters. Another body, Reshud, guards against terrorist activity. Abroad, the main intelligence agency (Israel's agency which is roughly equivalent to the American CIA) is the National Security Institute (Mossad Ha Bitakhon Leumi). A group called Agaf Modi'in (often shortened down to Aman) collects military intelligence abroad. Israel is a nation that has assessed its position as requiring a great deal of intelligence data and has therefore sought to establish a good and secure series of communications channels with its operatives.

Shortwave is important to all of these agencies because, as in most nations, public telephone and Telex links are felt to be useful for only the very lowest grade diplomatic and routine intelligence traffic. Shortwave

and satellite facilities would be used for more secure traffic, and in Israel's case there are no public telephone or Telex links from Tel Aviv or some of the places where Israeli agents operate—for instance other Middle East nations.

At Merkaz Tikshoret in Tel Aviv, the messages for transmission are first sent to the Ciphering Department where they are coded into the five-letter groups. This type of cipher has been used by the Israelis for almost 20 years, but many different methods for coding into the five-letter groups are in use depending upon the security level required.

The coded message is then recorded onto a cassette. This used to be done by the female operators speaking into a microphone. They had operating positions located in a long row of sound-proof booths. Now it is done using a machine they call *Bitemat* (pronounced bee-tay-mat) or automatic voice. This device uses dozens of tiny tape cartridges activated by a keyboard. This provides for consistent pronunciation and timing for every message. Although such a machine is somewhat less reliable than one of the modern electronic voice synthesizers, the results are more human-sounding. The completed cassette, with the call sign included and followed by the messages, is taken to the Transmission Room to be played at the scheduled time. The signal passes by landline, UHF link, or microwave to a network of HF transmitters at locations throughout Israel. There are more than twenty transmitters having powers ranging from 10 to 20 kW. For transmissions within Israel and adjacent areas, AM or A3H (60% carrier suppression) are the preferred modes. Transmissions directed overseas are sent out in A3H or SSB.

Message Format

The transmission format is made up of a few minutes of the station call sign (three letters followed by the digit 1 or 2). Overseas transmissions have at least four minutes of call sign but those to within Israel and surrounding areas run the call sign for only two minutes. A typical transmission to overseas has the following format:

Call Sign (at least four minutes)
"Three messages, three messages"
"Message, message"
"Group Four Five, Group Four Five" (the recipient)
"Text, text"
Here the message is sent.
"End of message"
"Message, message"
"Group Seven Two, Group Seven Two"
"Text, text"
The second message is sent, and so on.
"End of message, end of messages, repeat, repeat"
All messages are sent again.
"End of message, end of messages, end of transmission"

The transmission format is somewhat more simple for those transmissions indicated "A" and "B" on the frequency list. These

transmissions just contain the callsign and message with no repeats, although the messages themselves tend to be lengthier than those designated "C" and "D."

It is especially interesting to note that something occasionally goes wrong with these transmissions. The most common problem appears to be jammed or otherwise faulty cassettes. There is also some difficulty encountered with crosstalk between transmitters and this is evidenced by being able to faintly hear another message in the background. Several times the crosstalk has been so severe that both messages come through at equal levels.

Additional Thoughts

In the March, 1984 issue of *POP'COMM* there was a story entitled "How About Those Mysterious Transmissions?" in which several insights into the possible origin of these so-called phonetic alphabet stations (PAS) were offered. It was pointed out that there was a story in another publication which "suggested the possibility that the transmissions came from an Eastern European embassy in Canada." In respect to such a speculation, I would remind readers that this could be a case of mimicry of such signals.

Nearly all governments spend great amounts of time and money in monitoring all of the secret radio traffic they can. This is called signals intelligence (SIGINT) and is

carried out, for instance, by the National Security Agency in the USA, BROCEM for the Soviet Union (in East Germany), and by Government Communications Headquarters Composite Signals Organization (GCHQ-CSO) in Britain. This intense monitoring is carried out on a worldwide scale and in many cases there are embassy personnel as well as mobile monitors used for this purpose. This means that, even if they cannot decrypt the actual messages, the governments know frequencies and what types of codes and message formats are used by other governments—and their worldwide direction finding facilities (supplemented by those on naval and other vessels) have left little doubt as to specific points of origin for each of the coded signals.

If a government wishes to confuse the operatives of another government, one way of accomplishing the feat is by mimicry of those signals, using the same frequencies, message formats, and even codes. It has to be done with great precision in order to be convincing, however most agents in the field are on their guard to spot and recognize such spurious "messages." Of course, just because monitoring hobbyists cannot figure out the meaning of coded messages they tune in on, this does not mean that such messages cannot be fully understood and even mimicked by other governments. Being able to confuse and misdirect another government's field agents is, in fact, one of the finer points of the espionage game!

Inasmuch as the average monitoring hobbyist goes, these messages are generally incomprehensible. What, then, is there of real interest in tuning in and monitoring such coded transmissions? The chances of actually decrypting such a message are miniscule; nevertheless, it is still worth carrying out a statistical analysis of when the messages occur and also watching the overall nature of the messages. For instance, note how often different "groups" are sent messages and how long those messages tend to be. Then correlate this with events in Israel, the Middle East, or other areas. You may monitor a great deal of coded traffic on a particular day, and then the next day you learn that some major international "event" took place. Eventually you'll start to get the "feel" of which messages portend such headline makers, even if you can't extract the specific details of the messages themselves. With a bit more study, you may be able to sort out such messages as they relate to specific world hotspots—Central and South America, the Middle East, Korea, Africa, Eastern Europe, Afghanistan, Southeast Asia, etc. You may be surprised to learn that many governments use computers to do exactly this as an important aid to their intelligence gathering activities. To an efficient intelligence gathering agency, practically nothing goes to waste—even coded messages which cannot be decoded! To some extent, then, the astute hobby monitor can use such information to his or her interest.

Frequency kHz	Calls	Times/Target	Schedule Details				
2270	RCH	A	P5090	6500	FLU	B	P8330
2515	VLB	A		6840	CIO*	B & C	± 25 kHz
2745	YLX	A	P3930, 5230, or 5435	7115	ART		
2952	SYN	A		7445	KPA/ KPO	B & C	
3150	PCD	A	P4270	7539	JSR	B & C	P5087
3415	ART	A	P5435	7606	VLB	B & C	(Note 1)
	NCJ	A	P5435	7918	VLB	B & C	P4670
3930	YLX	A	P2745	8330	VHF	B & C	(Note 2)
	VLB*			8425	FLU	B	P6500
	VLX*				SYN/ SMN/ SVN*	B & C	moved to 8465
4057	FLU	B		8465	SYN	B & C	P12950, 5642
4270	PCD	A	P3150		MIW		
4448	NCJ	B		8806	YHF	B	± 5 kHz
4560	YHF	A & B		8925	CIO/ CIE*		
	BAC	B			SYN*		
4625	VEB/ VIB*	B & C	moved to 4670		VUB*		
4670	VLB	B & C	P7606		KPA*		± 10 kHz 2
4880	GBZ/ GBL	B		9130	EZI	C	P11565
	ULX	B		9325	CIO/ CIE/ CIF		
5087	JSR	B	P7539		EZI	C	P13921
	RCH	A & C	P2270		VLT	C & D	P9130 night or 17412 day
5230	ULX	A	P2745	11565	KPA*	C & D	
	BAC*				MIW/ MIO/ MLW		
5295	JSR	B & C		12412	SYN	C & D	P17170
	NCJ	B		12747	VLB/ VIB	B & C	P8465, 5642
5437	ULX	C			CIO*		
	ART	A	P3415		VIB*		
	NCJ	C		12950	KPA*		moved to 13921
5642	SYN	B & C	P8465, 12950		CIO	C & D	P17965 day or 9325 night
5670	MIW*				MIW	D	P12747
5760			standby frequency	13150			
5820	YHF	B & C					
6270	YLX	B					
	JSR	B		13921			
	GBZ	B		17170			



Many of the female operators have been replaced by recorded voices. This "YL" staffs a monitoring station.

17412	EZI	D	P11565
17595	CIO*		
	MIW*		
	EZI*	D	
17965	CIO	D	P13921
	MIW		P12747

KEY

- A = "Night" list to Near and Middle East 1600-0400 GMT
- B = "Day" list to Near and Middle East 0400-1600 GMT
- C = "Night" list—Overseas traffic 1645-0445 GMT
- D = "Day" list—Overseas traffic 0445-1645 GMT
- * = Not in current use
- P = Operates in parallel with _____

Suffix To Calls

- 1—Test (Purposes V, P, T, C)
- 2—No messages

Times of Principle Services

RCH, ULX, PCD, ART, FLU, NCJ, YAF, GBZ, JSR, KPA—on most hours and half hours

VLB—on ¾ hour and ¼ hour

CIO—on most ¾ hours

- EZI—0500
- 0600
- 1100
- 1200
- 1515
- 1720
- 1800
- 1900

MIW—certain ¼ hours

SYN—on the half hour

Note 1 — also used by station 4XQ57 for Telex traffic

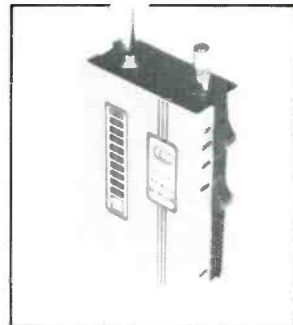
Note 2 — also used by station 4XQ97 for Telex traffic



HOW TO SURVIVE 1984

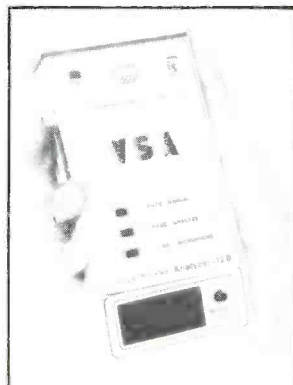
PROTECT YOUR PRIVACY

This palm sized system lets you know if anyone in the room is wearing a bug. With a series of lights the VL 34 even locates the source of transmission. It allows you to perform an electronic "sweep" with the same accuracy of professional systems. And it fits in your pocket to provide privacy wherever you go.



FIND OUT WHO'S LYING

The VSA gives you a simple way to detect lies. It electronically analyzes a person's voice to detect tremors that the human ear can't even hear. A simple digital readout will help you identify who's lying — who's stealing — who your enemies really are!



INSURE YOUR TELEPHONE PRIVACY

One of the world's most sophisticated telephone privacy systems, the CC 7000 RC makes your conversation indecipherable to eavesdroppers. Every tenth of a second, the computer controlled CC 7000 RC automatically changes its own privacy codes. So interception is impossible. Only the legitimate speaking parties hear clear conversation.



Send \$50.00 for catalog and special report on how to protect yourself against bugging and wiretapping.

CCS Communication Control Inc.

PopComm

633 Third Ave., New York, NY 10017.

Enclosed is my \$50.00. Please send your literature.

Name _____

Address _____

Zip _____

Phone _____

CCS Communication Control Inc.

633 Third Ave., New York, NY 10017 212-697-8140 TX: 238720

1010 Wisconsin Ave. NW, Washington, DC 20007 202-659-3432

1435 Brickell Ave., Miami, Fla 33131 305-358-4336

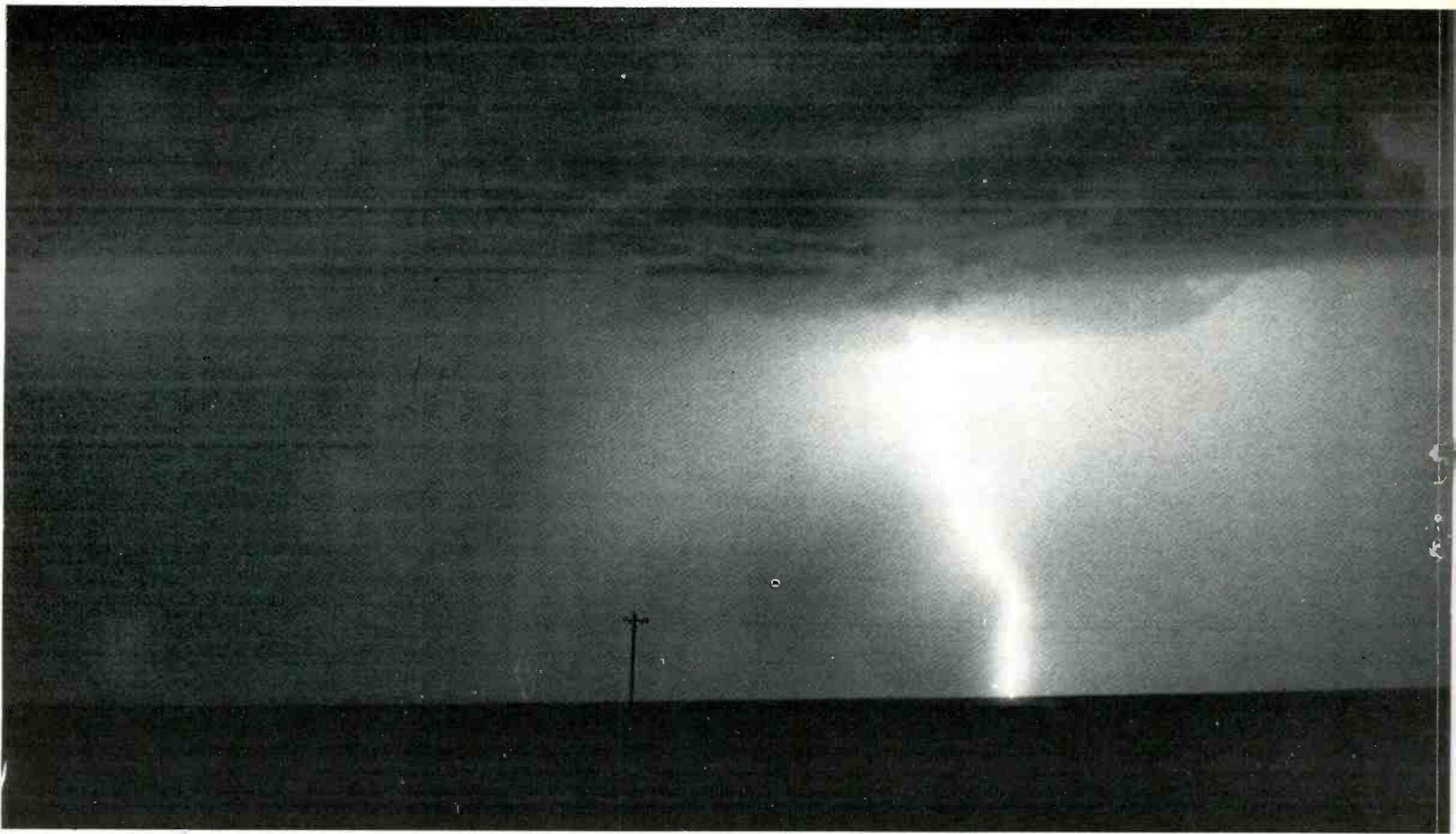
9465 Wilshire Blvd, Beverly Hills, Ca 90212 213-274-6256

320 N. Michigan Ave., Chicago, Ill. 60601 (312) 726-0998

6161 Savoy, Houston, Tx. 77036 713-781-0852

62 South Audley St., London W1 01-629-0223 TX: 8814709

26 Place Vendome, 75001 Paris 297-56-00 TX: CCS 215524F



Lightening Your Load And Other Communications Horrors

Electricity On The Rampage Is A Lot Worse Than You Think!

BY DON TYRRELL, W8AD, ALPHA DELTA COMMUNICATIONS

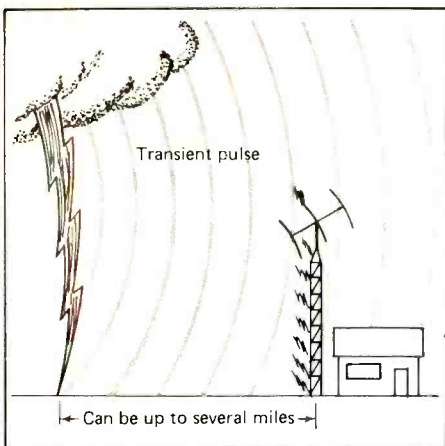
Undoubtedly at some time in your life you've been awestruck, or maybe you've struck it rich, or been struck by inspiration. Believe me, you don't know what it means to be struck until you've come face to face with modern solid-state communications equipment that has been zapped by the effects of lightning at a distance from your location—or a static discharge. Forget about the rules of the lightning protection game you may have learned in the days of vacuum tubes, solid-state equipment (communications receivers, scanners, etc.) is different! Those old time rules were fine in their day, but they're all out the window now! Or maybe you're one of those intrepid souls who thinks, "I don't need lightning protection because my antenna has never taken a lightning strike." That outlook is valid only if you're located on Fantasy Island.

And don't tell me how you always disconnect your coax or ground your antenna during a storm. Mother Nature is lurking in some far off *cumulo-nimbus* cloud just waiting for her chance to teach you the facts of life. However, you may not really want to be one of her students.

Her lesson is often delivered swiftly and without warning (or mercy), particularly since solid-state components have become the primary ingredients of modern communications gear. While solid-state devices have many obvious technical advantages over vacuum tubes, their internal junctions are far more fragile and sensitive to voltage spikes and discharges. The very origin of these spikes and discharges (called transients and surges) makes the several "excuses" mentioned above invalid. For one thing, surges can be generated by *nearby*

lightning strikes and static build-up, but they can also cause damage and destruction to the components of your communications gear from several miles away. These sources are typically out of your sight and offer you no time to go into the grounding or disconnecting scenario. Notwithstanding the effects of lightning, similar damage can even result from static discharges produced by things such as wind-driven snow, high wind in dry climates, and clouds on a still day. Fact is that damage to your solid-state equipment is 1,000 times more likely to occur from these sources than from a direct ground-zero strike on your antenna system!

The result can well be a popped front end on your receiver, and that's Mother Nature's way of showing you how golden silence can be; for, indeed, you may well be cashing in your Krugerrands to pay for the repair bill in



The energy from a distant lightning strike or static discharge can sweep across your antenna with a rate of rise of 10 to 20 KV/usec, a pulse peak of 5 KV, and several hundred amps of current.



The Alpha Delta Communications Transi-Trap model LT protector.



This is the Transi-Trap model R-T lightning protector.

order to get your equipment to the point where it will again produce for you the short-wave sounds you so much admire.

It's actually a matter of opinion if sudden equipment failure is better or worse than one other common way for a transient to affect your equipment. Damage is not always instant and catastrophic. Sometimes your equipment becomes mortally wounded, suffering junction damage which degrades over a period of weeks or months. The results are insidious; subtle system problems and a slow, gradual loss of sensitivity may occur which you may not readily notice until

one day you realize that you're hearing only local stations!

As I mentioned, the potentials for such problems exist in every part of the nation. Even in sunny California, where (they say) it seldom rains, there are an average of 5 days per year with thunderstorms. The Southwest, in general, has 20 to 40 thunderstorms per year (except for Texas, which does everything in a big way and offers 40 to 70 per year). The Midwest and East Coast run about 30 or 40 to as many as 50 thunderstorms annually, with the exception of Florida where you can expect up to 100 thunderstorms per year.

Generation Gap

In the days of vacuum tube communications equipment, it was a good idea to use the old standby air-gap type lightning protection device. This was like an auto spark plug. One side of the gap was grounded and the other side was connected to the center conductor of your antenna cable. The reaction time of such devices was slow, but adequate to protect the vacuum tube equipment—and, to boot, they also allowed arc-energy to flow on the chassis of the equipment. Many communications users do not realize that such devices hardly meet the needs of modern solid-state equipment.

A lightning stroke is quick and powerful—very quick and very powerful. Typically, it represents a rapid rise to a peak voltage of 3 to 5 kV in only 2 to 10 microseconds and it contains 500 to 20,000 (or more) Amperes. In the time it takes the old fashioned air-gap lightning protection device to cope with such a blast of energy, your sensitive and fragile solid-state components could well be dispatched to a fast (or slow) trip to their final reward in Silicon Heaven. What to do? Any time one is faced with harnessing the potent forces of nature it presents a challenge. But challenges are the things which created miracles such as solid-state devices in the first place, and have also now lead to a way of adequately protecting them from transients.

Alpha Delta Communications has researched, developed, tested, and marketed lightning and static protectors specifically intended to be used with solid-state communications equipment. These units, called Transi-Traps, are made with the protection gap hermetically sealed inside a special gas isotope tube. The isotope has known breakdown characteristics and response time, thus eliminating the air path for the spark to traverse. The erratic arc-forming characteristics of the molecules of air in old style air-gap type devices have thus been totally eliminated. With the gas isotope on duty, before the transient can do any damage to your equipment, it flashes through the isotope—silently, quickly, harmlessly—safely shunting it to ground. It takes only 100 nanoseconds. A special "isolated ground" feature of the Alpha Delta Transi-Trap units keeps damaging arc-energy off the chassis and also speeds it on its way to ground.

All of the different models offered in the Transi-Trap series can be used with all re-

ceivers and scanners, however various models can also be used with different types of transmitters. The models available are:

- Model LT: UHF "T" type, will handle 200 watt transmitters thru 148 MHz
- Model HT: UHF "T" type, will handle 2 kW transmitters thru 148 MHz
- Model R-T: UHF connectors, will handle 200 watt transmitters thru 500 MHz
- Model HV: UHF connectors, will handle 2 kW transmitters thru 500 MHz
- Model R-T/N: N connectors, will handle 200 watt transmitters thru 1 GHz
- Model HV/N: N connectors, will handle 2 kW transmitters thru 1 GHz
- Models R-T/BNC and HV/BNC are similar to the R-T/N and HV/N but have BNC type connectors.

These units have been thoroughly tested by independent labs and are in use by government and military installations around the world. It should be pointed out that Alpha Delta Transi-Trap devices are designed to reduce the hazards of lightning-induced surges. There are no claims that they will protect from a direct lightning hit, because there is no standard by which to describe one. Some hits can generate more than 100,000 Amperes, causing even structural damage; some with far less amperage may be satisfactorily bypassed. Nevertheless, keep in mind that a direct stroke can cause fire or damage.

It is also worth noting that semiconductors are known to become damaged by transients entering electronic equipment via the route of power lines. This could be caused by switches, AC motors, surges from power company brown-outs and poor regulation, and even the effects of fluorescent lighting. If you had the chance to see a graph print out of the hash that is pouring out of an AC wall socket under the guise of "pure" electrical energy, you'd hardly dare to plug anything into it that wasn't fully protected.

Alpha Delta has therefore addressed its attention to this problem with the development of MACC Master AC Control Consoles. The MACC units, in a typical application, are now in use "in house" by a major computer manufacturer to protect their own vital systems from AC related damage. This was after extensive testing of all devices available in any price range. The surge protected AC models are:

- Model MACC: 8 outlets and master switch control
- Model MACC-4: same as MACC but with 4 outlets
- Model ACTT: wall socket direct plug-in with 2 outlets

We at Alpha Delta are proud of these products and will be pleased to send you additional information so that you can get an even better understanding of the factors involved in protecting your valuable electronic equipment from damage. Write to me and I'll pass it along to you. My address is Don Tyrrell, W8AD, Alpha Delta Communications, P.O. Box 571, Centerville, OH 45459, or just mark number 100 on the reader service card in this issue of POP'COMM. **PC**

ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

Logistics

The logistics of communications has always faced those who are conducting their operations "in the field." Those attempting to establish survival systems should certainly view matters of equipment supply, replacement, maintenance, and repair with the utmost seriousness. Since much of the field communications equipment used today by survival groups comes from the battlegrounds in Southeast Asia, I believed it might be especially valuable to discuss how this gear performs and check out its high and low points, its problems and advantages.

According to Lt. Gen. Charles R. Meyer, U.S. Army (Ret), one of the Army's top communications experts during the war in Southeast Asia (and as mentioned in his Dept. of Defense report entitled "Vietnam Studies: Division Level Communications 1962-1973"), "...slight differences between 'identical' parts which come from being produced by different manufacturers add to the problem" of supply and repair in general.

Spare parts, he said, were one of the main logistical headaches. Many different approaches to resolving the problem were tried. Some units tried to beat the supply problem by having their men scour the supply depots to locate parts and major items of equipment and requisition them on the spot. Other units tried to make the existing system work and found that they could manage, although other units found that it worked for them only if modified. This system was explained fully in Army Training Manual TM-38-750, and whether it was taken as the absolute gospel or only as a general guideline, the American forces in Southeast Asia did manage to keep their communications equipment going.

The so-called "closed loop" support system was established to control the flow of critical components or assemblies to and from the respective commands in hope of supporting prescribed levels of equipment readiness. Supply, retrograde, overhaul, and resupply were given special attention to ensure that critical items were quickly overhauled and rebuilt and then quickly returned to the supply system. This system allowed units to exchange critical items directly. The system was generally successful with radar and teletypewriter equipment but less so with radio gear because replacement items were not available for direct exchange. One innovation that made the system more efficient was the *jiffy bag*, a cushioned paper bag in which small modules and components could be shipped for repair and returned safely and quickly.

Problems in the receipt, issue, and distribution of communications equipment and



Batteries were used in all portable communications equipment but posed unique problems.

repair parts grew from the lack of radio knowledge at supply depots. Most people who worked at the depots were not versed in the increasing sophistication and technical makeup of equipment and components and the volume of communications supply.

Tactical units in Vietnam received power for their communications equipment from fixed plant generators, portable generators, and batteries. Civilian contractors operated fixed generators at some of the base camps. Portable generators were used extensively and were important in division communications. They were usually 3, 5, or 10 kW. When air conditioning was necessary for the efficient operation of some communications equipment, the 10 kW generators were used not only for powering signal equipment but the signals sections at base camps and other sites had to provide power for many other purposes such as perimeter lights. On smaller landing zones, "signal" often became synonymous with the responsibility for providing all electrical power at the location.

Commands had to emphasize maintenance if the generators were to survive under heavy and constant use. Heat, wind, and sand were constant enemies, and inadequately trained and improperly supervised operators often compounded the maintenance problem. Operators were frequently trained in the operation and maintenance of the motor but not the generator or they were trained to operate the system but not to maintain it. As a result, most units placed generators high on their list of problems.

Batteries were used in every vehicle, every tactical telephone, every switchboard, most

tactical radios, and in every generator of 5 kW and above. The climate in Vietnam was the enemy of batteries of all kinds. In the heat and humidity, the wet-cell battery reached its boiling point quickly and stopped working. Operators had to service cables, battery boxes, electrolytes, and connectors more frequently than normal to prolong battery life. Dry-cell batteries were also not immune for Vietnam's temperatures. They had to be kept in a cool, dry place. The suggestion that batteries be stored under refrigeration was usually ignored because any available refrigerated space was used for perishable foods and medical supplies. Dry-cell batteries were often stored in any available container, for example a steel case which changed temperature drastically from day to night. This storage method gave many units batteries that operated for only a fraction of the normal time.

One of the heaviest users of the dry, zinc and carbon oxide batteries (BA-386) was the AN/PRC-25/77 manpack radio employed by most tactical units. As secure transmission became more common, the usage requirements of these batteries, which had to be used in both the radio and the scrambler, increased significantly. To increase dry-cell battery life, the magnesium battery (BA-4386) was developed and first used in early 1968. The magnesium battery lasted almost twice as long as the zinc and carbon oxide battery and it did not have to be refrigerated. The magnesium batteries, however, generated a hydrogen gas which in a closed container built up and caused the batteries to explode and burn. Storing the

magnesium batteries in a well-ventilated area solved this problem.

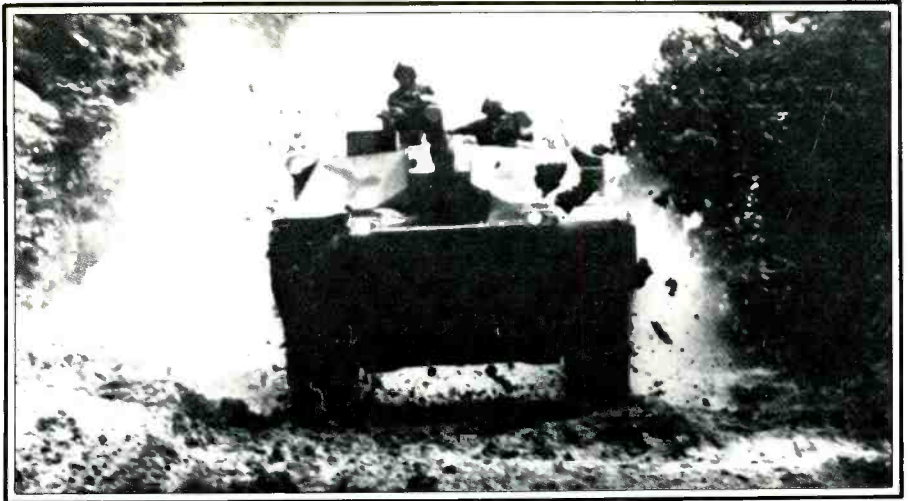
Batteries in storage were not always rotated to ensure that older stock was used first, and some became useless. Though the magnesium battery was a distinct improvement and means were developed to reduce or eliminate problems, batteries as well as generators were a constant source of problems.

From 1965 to the final redeployment of tactical units, numerous communications devices were introduced in Vietnam to provide tactical communications. In many cases, these assemblages consisted of whole families of equipment designed to replace obsolete gear. The AN/PRT-4 and PRR-9 squad radios replaced the AN/PRC-6. The AN/PRC-25 and 77 short-range FM radios replaced the AN/PRC-8-10. The AN/VRC-12 series FM radios replaced the RT-66-67-68/GRC (including AN/GRC 3-8, VRC 7-10, VRC 20-22, and VRQ 1-3 sets). And the AN-GRC-106 AM radios and teletypewriter replaced the AN/GRC-19. These four systems provided communication at specific levels or filled distinct needs.

The new two-piece, lightweight squad radio greatly increased the capacity of squad communications. It consisted of a 2-channel 47-57 MHz hand-held transmitter (AN/PRT-4) and an ultraminiature helmet-mounted receiver (AN/PRR-9). Designed to provide short-range (1600 ft. to 1 mile) tactical communications in the combat areas, it replaced the hand-held transceiver which was used for communications between squad and platoon. The new radio was considerably smaller, lighter, and more efficient than the older PRC-6 and could communicate with the VRC-12 and PRC-25/77 radios as well as with the PRC-6. It was used primarily within and between squads but could be used by larger units for other kinds of tactical missions. The squad radio was issued in early 1967 and by late that year was available to all tactical maneuver units. Units using the new radio varied in their opinion of it. Most would trade it for the AN/PRC-25/77 whenever possible for greater range and reliability. They considered the squad radio most effective in relatively static positions such as perimeter defense. The AN/PRT-4 transmitters, today, are available on the military surplus market for about \$35 in top condition. The accompanying AN/PRR-9 receivers have been less plentiful in the surplus marketplace.

The AN/PRC-25, a short-range 30 to 76 MHz FM radio, was modular and was transistorized except for a power amplifier tube. The radio was used in three basic configurations, manpack (PRC-25), vehicular (VRC-53), and manpack/vehicular (GRC-125). The first PRC-25's in Southeast Asia (mid-1965) were intended for advisors. With their initial distribution came the first new equipment training (NET) from the Electronics Command to begin instruction on the operation and maintenance of the VRC-12 and the PRC-25.

The AN/PRC-77 set was an improved version of the PRC-25. All solid-state design



The VRC-64 was often installed in armored vehicles. This was a version of the PRC-77.

made it more reliable. It also needed less power and could be used for secure voice communications. The PRC-77 was basically a manpack radio but could also be used in the three basic configurations, manpack (PRC-77), manpack/vehicular (GRC-160), and vehicular (VRC-64). The PRC-77 was compatible with the VRC-12 and PRC-25 families, with the ARC-54 aircraft radio set, and with the PRT-4/PRR-9 squad radio. The PRC-77 was organic to battalion-size units and was issued through platoon level. On today's surplus market, you'll pay about \$350 for one of these sets in good condition but \$600 for one in new condition.

The radio sets AN/VRC-12 and VRC-43 through VRC-49, commonly called the AN/VRC-12 series, were the new vehicular communication system used extensively by combat units. These FM radio sets (30 to 76 MHz) replaced the AN/GRC-3 through GRC-8 series. The new sets consisted of various combinations of two basic units, the RT-246/GRC transceiver and an auxiliary R-442/VRC receiver. An alternate transceiver used was called the RT-524. The RT-246 could select one of ten frequencies preset by the operator, but on the RT-524 each frequency had to be set manually. The RT-524 had a loudspeaker built into the space occupied by push buttons on the RT-246. The RT-524 was developed for use in vehicles where the operator could reach the panel easily; the RT-246 was designed for use in tracked vehicles where the operator could not reach the panel. In Vietnam this equipment was often removed from vehicles for use in bases such as forward tactical command posts. In most cases, major tactical units were issued the VRC-12 family of radios just before or shortly after their deployment to Vietnam during 1965 and 1966.

The high frequency (HF) communications system within a divisional area of operations was used almost entirely for RTTY operation. The AN/GRC-46 (1500 kHz to 20 MHz) or the AN/VSC-1 (2 to 30 MHz) equipment gave the maneuver battalions their only means of secure printed communications. At

brigade and division levels, RTTY for the most part provided only a backup for multi-channel secure teletypewriter circuits. The GRC-19 was replaced in 1966-67 by the newer HF SSB radio AN/GRC-106 (2 to 30 MHz) with its newer RTTY configuration, the half-duplex AN/GRC-142 (AN/VSC-2) and the full-duplex AN/GRC-122.

The AN/MRC-69 was a frequency division multiplex radio relay carrier terminal set which could provide 24 telephone channels and 12 teletypewriter channels. It was normally used at division and brigade levels as a dual radio carrier terminal providing two 12-channel systems. The set was the backbone of the divisions' multichannel systems. It was available in many equipment combinations (in addition to the basic MRC-69) such as the single terminal MRC-73, the CW/voice terminal MCC-6, and the radio repeater MRC-54.

The airmobile and airborne divisions needed a lighter, more mobile system. With the organization of the 1st Air Cavalry Division, a trend toward lighter systems began and resulted in the MRC-111 and MRC-112. Although they could be transported by helicopter easily, they offered only 4 channels. These were followed by the AN/GRC-163 (30 to 76 MHz) lightweight 4-channel single terminal radio consisting of the VRC-47 and a TCC-70 multiplexer. The GRC-163 had a communications range of 50 miles and provided multichannel communications between brigade and battalion where lines were not tactically feasible. The GRC-163 was designed for use in airmobile operations and was compatible with the VRC-12 and PRC-25 series of radios. Unlike the larger MRC-69 and MRC-112, the set was small enough to be airlifted in assault helicopters. Kits were also available for installing it in a quarter-ton truck or trailer. GRC-163's were first shipped to Vietnam in January 1968 and were accompanied by a two-man team from the Electronics Command. Another four-man team was sent to Vietnam in August 1968 to train personnel in the installation, operation, and maintenance of the equipment. **PC**

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 Wrongwire Antenna

I have taken the pedestal portion of a cordless telephone unit and plan to use it as a low power broadcast transmitter. It has an internal frequency adjustment which I used to lower the transmitting frequency from 1653 kHz to 1620 kHz. The addition of an external longwire antenna (152 feet in length) has tested out with excellent coverage for about five miles. It was a relatively inexpensive way of getting on the air with a neighborhood broadcasting station. I hope to broadcast Olympics information during July/August.

"Mr. Decathlon"
Olympiad Radio 23
Los Angeles, CA

While the FCC does permit unlicensed low-power broadcasting under certain technical restrictions (Part 15 of the Rules), your antenna is far too long to meet those restrictions. Your use of the base portion of a cordless telephone is clever; however if you want to keep it legal you'll probably have to disconnect the longwire and make do with the original internal antenna designed to be used with the pedestal transmitter. — Editor

A Look Back

I truly enjoy the POP'COMM stories about the events and stations that stand out in radio's history. I feel these articles alone are worth the price of my subscription; everything else is a bonus. That's like getting another magazine free. Being one of the "older generation," I'm wondering what feedback about the historical articles you've received from the sharp youngsters who are such an important element of our hobby. It would be interesting to know how they feel.

Larry G. Seabury
Flushing, NY

The information POP'COMM has run concerning the historic aspects of broadcasting and communications is universally popular and has consistently drawn mail asking for more of the same. Today's sharp youngsters are creating tomorrow's history and appear to be keenly interested in knowing from whence this dynamic hobby came.

— Editor

Hit The Decks

I would be interested in hearing from any Popular Communications reader who might be interested in corresponding with me via cassette tape. I enjoy listening to discussions

about various radio hobbies in addition to current events. I also like to discuss World War II history, UFO's, and outdoor activities. My main radio interests include DXing foreign shortwave broadcasters, marine radio, military communications, ham, CB, SSB, and scanner radio. Let's talk turkey!

Robert Pastrick
P.O. Box 183

Conway, PA 15027

How 'bout it readers? Here's an interesting way to share your hobby interests and experiences. — Editor

Will It Still Transmit?

Our survival training group recently received a donation of some older communications equipment from an area resident. Included were a pair of transceivers marked "Johnson Personal Messenger." There are receive crystals installed but no transmitting crystals and we don't know where they might be obtained. Some communications shops carry or can order CB crystals but none have this rig in their books.

Matty Olafsson
Boise, ID

These were relatively popular ten or more years ago and I can't imagine why they can't track them down in their records. No matter, they use the same transmitting crystals as a number of other rigs, including the Emerson 31P59, Fanon Masco "Rough Rider," Hallcrafters CB-6, Heath GRS-65A, and GRS-21A, Olson RA-638, and J. C. Penney Penncrest 10, to name just a few. If you can get those working they're quite good, although the technology isn't quite state-of-the-art. — Editor

The KATT Was In the Barn

In your February issue you had an article called the Outlaw Callbook and I can add a little information. The East Bay area of San Francisco was a hotbed of pirate broadcasting activity in the mid-1960's. The classic pirate was KATT, which operated from the Montclair district of Oakland about 1962-63. I believe it operated on 870 kHz and was closed down because someone who wanted to hear WWL in New Orleans complained to the FCC. KATT was operated by a student at Skyline High School. In 1964-65 it was succeeded by KWLS operated by BARN (Bay Area Radio Network). BARN was made up of high school students from neighboring Piedmont and Richmond, as well as the original KATT operator. There were actually 4 or 5 transmitters in BARN, all operating in two hour shifts on 880 kHz. The intent was to make it seem as if they were running different programs from the same station (in order to throw FCC monitors off the track). One of the stations got busted when it had to remain on the air for six hours after

two of the other BARN stations broke down. The last disc the station spun before the FCC pulled the switch was "Catch Us If You Can" by The Dave Clark Five!

George Wood, SMØIIN
Sweden Calling DX'ers
Radio Sweden
Stockholm, Sweden

Skip It

Last September you ran a story on rebel communications in El Salvador. You didn't mention anything about frequencies used by the government forces which are fighting the rebels. I'm interested in hearing those communications.

Alberto Corroero
Encino, CA

The best information I have available shows the National Guard using 151.475 and 155.30 MHz with the callsign HUMG, but you'd have to be located pretty close in to hear those communications. Some officers also have private and personal two-way communications setups so that they can communicate with their families at home directly from the combat areas. These communications are in the 2-Meter ham band using linear amplifiers. Of course, there are many VHF low band frequencies also in use via communications equipment supplied by our government and you can probably hear these transmissions. Check out the story in this issue for some of the frequencies that have been monitored hereabouts. — Editor

Doing It With Frequency

I have noticed and enjoyed the frequency and signal code profile information on the various state police and patrol agencies. Please advise which agencies have been included in past issues and if those issues are still available.

John P. Johnson
Eau Claire, WI

These state law enforcement agencies have been covered thusfar: Missouri (April 84), Montana (March 84), Utah (June 84), Indiana (August 83), Pennsylvania (July 83), Ohio (May 83), South Carolina (April 83), and Georgia (January 83). In addition, the San Francisco Police Department was profiled in the December 1982 issue, with the New York City Police in September of '83 and New York City Fire Department in November of '82. All of these issues (as well as any other back issues) are available from the Popular Communications' Circulation Department, 76 North Broadway, Hicksville, NY 11801. The issues from September 1982 through January 1984 are available for \$1.75 each, and all issues from February 1984 at \$1.95 each. — Editor

PC

PRODUCT SPOTLIGHT



ICOM Announces:

Six HF/VHF/UHF Radios



The ICOM IC-751 HF transceiver.

IC-751 HF Transceiver

ICOM announces an advanced, high-performing HF transceiver with general coverage receiver, the IC-751. The IC-751 features a new generation of technology and computer control. ICOM's new CPU with internal battery memory backup provides many advanced features, such as 32 memories with memory storage of mode and frequency, and the scanning capability to cover large segments of the spectrum very slowly or to scan the memories by selected mode. The IC-751 provides instantaneous, silent, band selection and has a unique 3-speed tuning system. Other features included are full break-in keying, passband tuning, notch filter, RIT and XIT with separate readout, FM built-in as standard, a very steep-sided FL44 side band filter, continuously adjustable noise blanker levels, dual VHO operation, and all mode squelch. An easy-to-read two color fluorescent readout showing the frequency in white and the control functions in red, for low eye fatigue and high visibility in all ambient light conditions is standard. The IC-751 is equipped standard for operation from 12 volts DC, and there is an optional internal AC power supply. The IC-751 has an advanced receiver design that provides true competition-grade performance.

IC-120

The IC-120 is a 1.2 GigaHertz FM mobile transceiver, covering 1260 to 1300 MHz. This unit is styled similarly and has features similar to the IC-25A/H series of 2-meter transceivers, and has many common features. Duplex split is variable, but is initiated at 20 MHz when the unit is first turned on. Duplex up and down as well as scanning features are offered. Power output is 1 watt.

ICOM is the first to offer the hams a full-featured mobile transceiver for this mostly unused band.

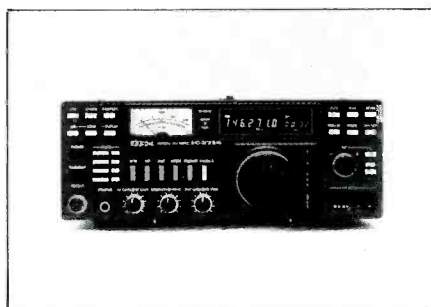
IC-471A

The IC-471A is a base station transceiver for 430-450 MHz. It features 10 watt output, 32 full function memories, and built-in subaudible tone selectable from the main tuning dial.

ICOM systems accessories work with the IC-471A. Also, this unit features ICOM's new two-color display, showing frequency digits in white and control functions in red for easy visibility in all lighting conditions. With the IC-471A, it is possible to scan all frequencies, memories, or modes.



The base station transceiver for 430-450 MHz from ICOM, the IC-471A.



The IC-271A base station transceiver covers the 2-meter ham band.

IC-271A

ICOM announces a new base station transceiver for 2 meters, the IC-271A. The IC-271A covers the entire 2-meter ham band, and features FM/upper side band/lower side band and CW modes. The IC-271A has a 25 watt output standard, with an optional built-in power supply. It has 32 full function memories. Built-in sub-aud-

ible tones selectable from the main tuning dial provide ease of operation. Frequencies, modes, tones, and offset may be written into each memory. Scanning is possible with the IC-271A; either the whole band, memories, or selected modes may be scanned. The IC-271A features ICOM's new high contrast, two-color display, showing frequency digits in white and control functions in red.



The IC-RP1210 repeater can be used with the IC-120 mobile transceiver, as shown.

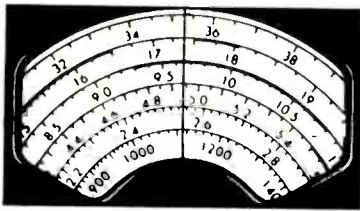
IC-RP1210 Repeater

To complement ICOM's entry into the 1.2 GigaHertz band with its IC-120 mobile transceiver, ICOM is announcing the inclusion of a 1.2 GigaHertz repeater in the equipment line. This repeater will have a power output of 10 watts, CTSCC capability, IDER and DTMF control. The RP1210 is synthesized to be complementary to the IC-120 transceiver, and has a duplex split of 20 MHz.

IC-RP3010 Repeater

This ICOM RP3010 repeater is designed for use in the 440 MHz Amateur band. It offers 10 watts of output power, CTSCC capability, IDER and DTMF control. The 440 MHz repeater is of very high quality and rugged construction and is designed to work over a wide temperature range. The ICOM 440 MHz repeater is crystal controlled. **PC**

This information was extracted from manufacturer's literature.



COMMUNICATIONS CONFIDENTIAL

BY HARRY HELMS, KR2H

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

My recent request for listeners equipped with direction-finding loop antennas to participate in a coordinated effort to locate various numbers stations is beginning to pay off. In this month's Listening Reports, you'll note bearings included for several loggings (particularly those submitted by Ron Ricketts of Texas). In direction-finding, a bearing of 90 degrees is due east, 180 degrees is due south, 270 degrees is due west, and 0 degrees/360 degrees is due north. Ron is located near Fort Worth, Texas, and you can get a rough idea of where some of these stations may be located by referring to a map and extending the bearing. Note that the locations vary, even for stations on the same frequency. More loggings along this line, especially a simultaneous logging by two or more listeners, could identify all the different transmitter sites used by these stations.

Who Is "AME3"????

For several columns, listeners have been reporting a station identifying itself as "AME3" in both CW and RTTY on various frequencies, usually calling "UMA7." UMA7 is a call assigned to the Soviet Union, while AME3 belongs to the allocations for Spain. However, the reception times for "AME3" and the traffic to a Soviet station make it unlikely that AME3 is actually licensed to or even located in Spain. Ron Ricketts writes that he believes that AME3 is aboard a Soviet or Soviet-sponsored vessel in the Caribbean. He has noted that AME3 operates on several frequencies only 2 to 3 kHz away from frequencies used by four-digit Spanish number stations. Several times Ron has heard AME3 begin an RTTY transmission immediately when a numbers transmission on a nearby frequency ceased! Have any of you observed unusual activity with AME3 or gotten a bearing on it?

Numbers Activity In Europe

Recently I received a letter from a listener in England who keeps track of numbers stations that can be heard there. Since eavesdropping on non-broadcast transmissions in England is subject to various legal restrictions, our correspondent wishes not to be identified. Here is a list of numbers stations recently heard in England listed by frequency, type, language, sex of announcer, and time in GMT:

3217	Five-digit German female	1809
3229	Five-digit German female	2236
3258	Five-digit German female	2204
3369	Five-digit German female	2213



Condor Azul's antenna in Bogota.



Station "Condor Azul" in Bogota, Colombia.

3372	Five-digit German female	2037
3384	3/2 German female	2134
3564	Five-digit English male	1833
3819	Eight-digit German female	2100
3819	Five-digit German female	2217
4010	Five-digit German female	2105
4399	3/2 German female	2223
4791	Five-digit German female	2118
4990	3/2 German female	2210
5089	3/2 German female	2226
5225	3/2 German female	1846
5692	3/2 German female	2116
5733	Five-digit German female	2216
5769	Five-digit German female	2044
5773	3/2 German female	2212
5821	Five-digit German female	1106
5910	Phonetics German female	2209
6203	Five-digit German female	2231
6235	3/2 German female	2208
6355	3/2 German female	2227
6453	Five-digit German female	0717
6825	Five-digit German female	2220
6852	Five-digit German female	0814
6860	3/2 German female	0816
7374	3/2 German female	1815
7403	3/2 German female	1206
7410	3/2 German female	1505
7531	Five-digit German male	1940
8079	3/2 English female	2124
8119	3/2 German female	2111
8315	3/2 German female	2225
9244	Five-digit German male	0820
9326	Phonetics English female	2018
9435	3/2 English female	2108
9450	Five-digit English female	2114

Our thanks to our English reader for these loggings!

References And Assistance

Each month I get several requests for help in locating various stations and their locations. If you're seriously interested in keeping track of the various activities discussed in

this column each month, a set of reference guides is essential.

The basic reference guide is a copy of the latest edition of the *World Radio TV Handbook*. Even if you don't actively tune shortwave broadcasts, you'll find a current edition valuable.

An equivalent reference for utility stations is also important. A good one is the *SPEEDX Reference Guide to the Utilities*, published by SPEEDX (P.O. Box E, Lake Elsinore, CA 92330). It's available from them for \$14.00 First Class mail. Another important reference is the *Guide To Utility Frequencies* available from CRB Research, P.O. Box 56, Commack, NY 11725 (\$12.95 plus \$1 postage).

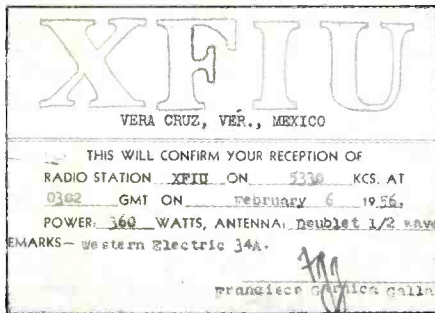
It's also important to belong to a club that covers the activities you're interested in. Three I can heartily endorse are the American Shortwave Listeners Club (ASWLC, 16182 Ballard Lane, Huntington Beach, CA 92649), the Association of Clandestine Enthusiasts (ACE, P.O. Box 13225, D.T. Station, Minneapolis, MN 55414), and the Longwave Club of America (LWCA, 45 Wildflower Road, Levittown, PA 19057). All three of these clubs will be happy to send you a sample bulletin for \$1.00 along with full membership details. These clubs offer an ideal way to get the latest DX information quickly and make contact with your fellow radio hobbyists.

Listening Reports

Here are this month's Listening Reports. Your reports are welcome here; submit them in the form you see used in this column. Include enough details to make your reports useful to other POPCOMM readers; that means including languages, sex of the announcers, etc. Send your reports to



Chinese BYIPK QSL card. (Courtesy N4IA)



Communications Confidential, Popular Communications, 76 North Broadway, Hicksville, NY 11801. And now to this month's reports . . .

16: GBR, Rugby, England, transmitting second pulses in CW 0856, long dash at 0900 and into RTTY. (Tom Adams, WI)

16.5: JXZ testing in CW 0703, was manually keyed and sent a string of VVV. Where is this one? (Tom Adams, WI) Call is part of the block assigned to Norway. Any further clues? (Editor)

405: CM, Channel Head, NF, Canada, CW beacon 1938. (Flip Minton, IL)

418: WSL, Amagansett, NY, traffic list in CW 0800 followed by sports results. (Tom Adams, WI) As noted in the March issue of POP/COMM, ITT's plans call for this well-known old station to soon leave the air. (Editor)

484: KLC, Galveston, TX, sending a weather report in CW 1145. (Tom Adams, WI)

517: YWA, Petawawa, ON, Canada, CW beacon 0857. (Flip Minton, IL)

517: OS, Columbus, OH, CW beacon 1013. (Flip Minton, IL)

524: DWH, Houston, TX, CW beacon 0905. (Flip Minton, IL)

1746: "Musical" marker similar to the letter J in CW but with the di on B (493.3 Hz) and the dahs on G (392 Hz). (Robert Margolis, IL)

2197.2: AME3 sending RYs in RTTY 0503 425/100. (Robert Margolis, IL)

3090: Five-digit Spanish numbers station with female announcer 0202, bearing was 68 degrees. (Ron Ricketts, TX) Similar station noted at 0110 but in SSB. (George Osier, NY)

3646: Male reading a string of numbers very rapidly, like an auctioneer, around 0210. Was parallel to 4640 kHz. (Ron Ricketts, TX) This station has been named "The Babbler" by DXers and is being widely heard. (Editor)

4100: Five-digit Spanish numbers station with female announcer 0200; mode was FM! (Ron Ricketts, TX)

4183.2: AME3 sending RYs in RTTY 0404 425/100. (Robert Margolis, IL)

4225: "UMA7 DE AME3 RG" in CW 0603. (Robert Margolis, IL)

4300: Five-digit Spanish numbers station with female announcer 0203, heard "Lima Bravo" repeated in the background a couple of times! (Dave Bush, OH)

4544: Five-digit German numbers station with female announcer 2310; was in SSB and opened with musical tones and "Mike Uniform." (George Primavera, NJ)

4890: "Romeo Tango" working "Romeo Papa," "Romeo India," and "Romeo Alpha" around 0540 in SSB and Spanish; many male and female voices heard. (David Eaton, AL)

4900: "Fisher" working "Dishpan" in SSB around 0530, with many references to RTTY traffic on 5718 and 3187 kHz. (David Eaton, AL)

4990: Five-digit German numbers station with female announcer 2234; was in SSB. Two days later, a four-digit German numbers station with a female announcer in SSB was heard at 2029. (George Osier, NY)

5010: 0255, flute/bagpipe tones in SSB followed by male counting to 100, then "warbling" and second pulses until 0313, when there was an RTTY-like sound. At 0316 there was two-way traffic in Spanish by two men in SSB, followed at 0330 by another count to 100. (Thad Adamaszek, OH)

5178: Five-letter groups in CW ending 0258 with "T T P H T P H ZDP," then repeated until 0325. (Robert Margolis, IL)

5642: "Sierra Yankee November Two" repeated by woman in AM from 0158. (Robert Zeisloft, FL)

5748: Five-digit German numbers station with female announcer 2320, was in SSB. (Tom Lewandowski, NY)

5810: Four-digit Spanish numbers station with female announcer 0130, strong signal. (David Bush, OH)

5812: Five-letter groups 0919, used only letters A, D, G, I, M, N, R, T, U, and W; ended 0926 with "AR AR AR VA VA VA." (Robert Margolis, IL) This has been a very active frequency for four-digit Spanish numbers stations for several years. (Editor)

5812: Four-digit Spanish numbers station with female announcer 0310, bearing was 114 degrees. (Ron Ricketts, TX) Which would put the transmitter somewhere in southern Florida, northern Cuba, or Puerto Rico. (Editor) Later reception at 0124, parallel to 5418 kHz; bearing was 133 degrees. (Ron Ricketts, TX)

6251: AME3 sending RY test slip in RTTY 0625 850/75. (Ron Ricketts, TX)

6254: "Alpha Whiskey," "Hotel," and "Romeo" in SSB around 0800 discussing tracking what seemed to be airborne objects. (Ken Navarre, Jr., CA) From some of the conversations you quoted, Ken, it sounds like you heard a military training exercise. (Editor)

6271: Five-letter groups from the international phonetic alphabet read by woman 0405. (Robert Zeisloft, FL)

6508: Five-digit German numbers station with female announcer 0600. (George Primavera, NJ)

6683: Air Force One working Andrews AFB in SSB 0125 via satellite communications network. (Thomas Cerf, IL)

6768: Five-digit Spanish numbers station with female announcer 0508, very strong signal. Station looped at 78 degrees. (Jim Thornton, TN) Such a bearing would place the transmitter somewhere in northern Virginia, Washington, D. C., or southern Maryland. But five-digit stations are supposed to be from Cuba . . . aren't they??? (Editor)

6782: Five-digit Spanish numbers station with female announcer 0500, was in SSB. (Tom Lewandowski, NY) Similar station noted in AM 0430 on 6785 kHz. (George Primavera, NJ)

6802: Four-digit Spanish numbers station with female announcer 0552, bearing was 118 degrees. (Ron Ricketts, TX) Note similar bearing on 5812 kHz. (Editor)

6840: "Cut" CW groups 0330, only 4 and 6 left uncut. (Ron Ricketts, TX)

6916: Five-digit Spanish number groups read rapidly by female 0127, was in SSB. Seemed to be live and in contact with a Spanish speaking male. Variable times per group. (E. R. Quackenbush, NY) Yes, a few "live" numbers stations can be heard. (Editor)

7430: Five-digit Spanish numbers station with MALE announcer 0306, fair signal. (Dave Bush, OH)

7527: Five-digit Spanish numbers station with female announcer 0300; bearing was 120 degrees. (Ron Ricketts, TX)

7532: Five-digit German numbers station with female announcer 0116; each group was repeated twice and sounded live. (Ron Ricketts, TX)

7850: ZAA, Tirana, Albania, testing in RTTY with RYs and French news 1900 425/66. (Robert Margolis, IL)

8380: AME3 testing in RTTY with marker "AME3 2/4/6/8/17 QW RG 12 JG RYRYRYRY AME3 2/4/6/8/17 QW RG 12 RG SSGSGSGSG" 425/100 at 0213. (Robert Margolis, IL)

8417: Four-digit Spanish numbers station with female announcer 0920; bearing was 134 degrees. (Ron Ricketts, TX)

8441: "UMA7 UMA7 UMA7 DE AME3 AME3 AME3 13RG 13RG 13RG" repeated in CW 0310. (Mark Mercer, NJ) Another logging of this month's big mystery station. (Editor)

8873: Five-character groups in modulated CW 0204; very strong—sounded like groundwave! (Ron Ricketts, TX) Modulated CW is tone keying sent by AM. It can be easily copied without a BFO and is frequently used by CW numbers stations. (Editor)

9014: "Gunrunner" USAF tactical call heard in SSB 2001. (David Hardy, VA)

9074: Four-digit Spanish numbers station with female announcer 1131, weak signal. (Dave Bush, OH) Same heard at 0024, bearing was 138 degrees. (Ron Ricketts, TX) Similar heard on 9075 kHz at 0000; complete message repeated at 0123. (Larry Gunther, NE)

9326: Five-letter groups in English read by female 2245; was in SSB. (George Primavera, NJ)

10704.5: GMP, Interpol, London, England running RY test slip in SITOR 1525 425/66. (Robert Margolis, IL)

10780: AFE71, Cape Canaveral, FL in communication with "Agar 25" (tracking and ranging aircraft) the day before a Space Shuttle launch. They also tried 9132 and 6937 kHz. (Tom Lewandowski, NY)

11152.4: Coded traffic in CW 2055, mixed numbers and letters; only digits 4, 5, 6, and 7 used and letters J, K, O, and P were not used. Off at 2207 with no sign off. (Robert Margolis, IL)

11493: "BRAXDRAXBENET" repeated in CW several times 2338. (Robert Margolis, IL)

11532: Four-digit Spanish numbers station with female announcer 2315, was in SSB. (Robert Margolis, IL) Similar station in AM 1430, bearing was 84 degrees. (Ron Ricketts, TX) Later noted at 2339 in AM parallel to 9074 kHz; bearing this time was 126 degrees! (Ron Ricketts, TX) So apparently numbers stations at different transmitter sites use same/similar frequencies. Or is this a portable/mobile transmitter of some sort, such as a ship? (Editor)

12842: HLO, Seoul, South Korea, CQ marker in CW 2015. (Lary Imhoff, WA)

13400: Five-digit Spanish numbers station with female announcer 2134. (Robert Margolis, IL)

13412: "KKMHUMLUKK" repeated in CW 1759. (Robert Margolis, IL)

13530: "RMU NT" repeated in CW for one minute 1903, followed by 20 five-letter groups. (Robert Margolis, IL)

14441: Four-character CW groups 0320; only possible identification was "A6E" sent twice in middle of transmission. (Michael Hanna, NY)

14846: Five-digit Spanish numbers station with female announcer 2100; bearing was logged at 79 degrees. (Ron Ricketts, TX)

15030: Station in Spanish apparently broadcasting 1910, loud signal and Chicago mentioned several times. The "broadcast" closed with phonetics in groups of four read by a woman. At the conclusion, the station transmitter was turned off and on for the next ten minutes. (Robert Margolis, IL)

15045: "Skyking" broadcast in SSB at 2100 and 2200. (Paul LeVinus, NY) These are coded messages to SAC bombers aloft. (Editor)

15955: 3BT4, Plaisance, Mauritius, sending RY test slip in RTTY at 1828 850/66. (Dallas Williams, CO)

16501: Five-letter groups in RTTY 1925, followed by "NR 107 GR 63 EOOYQ SEE WLLY QRZ FM 20, 4040" and then more groups. Closed at 1931 with "QRU QRU SK SK" 425/66. (Robert Margolis, IL)

17408.5: WWD, La Jolla, CA, in SSB 1654 working ship at sea. (Robert Margolis, IL)

22313: CWA, Cerrito, Uruguay, CQ marker in CW 2314. (Gary Bledsoe, FL)

22325: PCH70, Shevenigen, The Netherlands, "DE PCH70 22 K" CW marker 1426. (Gary Bledsoe, FL)

22387: JCT, Choshi, Japan, CQ marker in CW 2323. (Gary Bledsoe, FL)

22390: FUF, Fort-de-France, Martinique, V marker in CW 1433. (Gary Bledsoe, FL)

22399: JNA, Tokyo, Japan, V/CQ marker in CW 2320. (Gary Bledsoe, FL)

22408: GKC, Portishead, England, "DE GKC" marker in CW 1435. (Gary Bledsoe, FL)

22426: LGW, Ganddand, Norway, CQ marker in CW 1548. (Gary Bledsoe, FL)

22443: YUR, Rijeka, Yugoslavia, V marker in CW 1339. (Gary Bledsoe, FL)

22534: ZLB2, Awarua, New Zealand, CQ marker in CW 2207. (Gary Bledsoe, FL)

22545: FUM, Papeete, Tahiti, V marker in CW 2301. (Gary Bledsoe, FL)

22567: HEC, Berne, Switzerland, "HEC QRV" repeated in CW 1554. (Gary Bledsoe, FL)

NEW AND EXCITING TELEPHONE TECHNOLOGY

Quieting Your Cordless — Those Add-On Kits Work!

The new 46 MHz/49 MHz cordless telephones are still a couple of months away, and there may be many of you who presently own a 1.7 MHz/49 MHz cordless telephone and are quite pleased with its operation. However, you may be only partially pleased with its operation, because sometimes it works and sometimes it doesn't.

Let's look at those times it doesn't work to see what might be causing all of the interference on your 1.7 MHz/49 MHz set-up.

Most of the racket occurs on the cordless handset. As you walk around your house or office, anything and everything seems to interrupt reception. However, the person on the other end of the circuit hears almost no interference. This is because you are trying to receive signals off of the AC power lines with your cordless handset. The 49 MHz talk-back link is usually interference-free.

What creates interference on the AC power lines to your cordless handset? Here's just a partial list of the worst offenders:

- Fluorescent light "chopper" circuits
- Lamp dimmer circuits
- Office and home computers
- Electronic calculators and automatic dialers
- Refrigerators, air conditioners, and fans
- Electric razors, mixers, and food processors
- Automotive battery chargers
- Power tools

All of these devices just mentioned generate electromagnetic pulses that are fed back into your AC power lines. If your cordless base transponder is plugged into the same AC power feed as these devices, chances are the interference will be transferred into your 1.7 MHz link. Remember, this half of your cordless telephone set-up uses your AC power lines as its antenna.

One way to easily overcome this problem is to plug your base transponder into a receptacle that is the immediate area where you plan to use your cordless phone. This gives you maximum field strength to the transmitted signal that will help mask out the weaker static on the line. If you usually use your cordless telephone while in the garage, put the transponder in the garage. Although you may have to run some new telephone lines to your new set-up, you'll generally achieve a quieter connection.

If you work in the garage but your transponder is 300 feet away at the other end of the house, chances are the reception will be noisy. Your cordless handset is picking up the local noises rather than the distant telephone signal. You can witness this yourself; just walk toward your base transponder and you'll hear the reception improve.



Sometimes handsets pick up static from the household power lines.

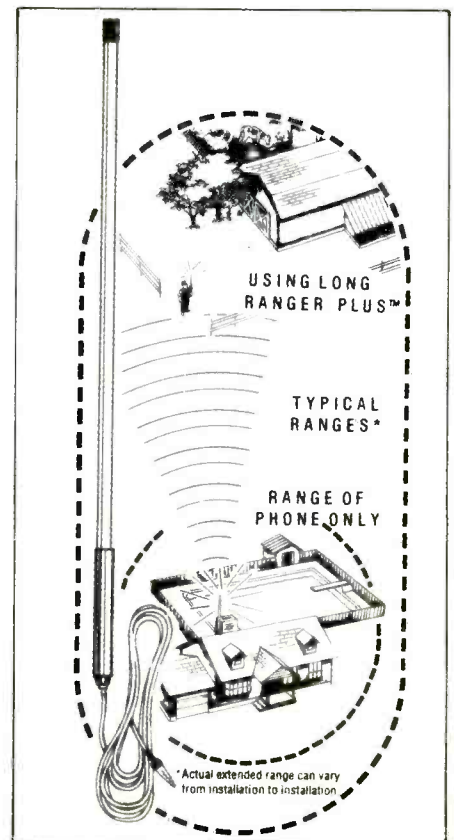
If it's impossible to relocate the base transponder exactly where you most often use the handset, try relocating the base transponder to a different AC outlet. Try different outlets in the house where there is a nearby telephone connection. You might be able to send the telephone energy down a different power line and improve reception. Sometimes a long extension cord on your transponder will help increase the signal level.

Trying to shield each noisemaker could be very expensive and take great effort. I recently pulled every electronic light dimmer in the house and built in a special toroidal choke to cancel out some of the interference. I did all seven dimmers, and it took me all day. Although the results were noticeable, it's still better to keep the dimmers completely turned off or all the way on when making cordless phone calls. Leaving any dimmer in the half-way point will generally create the most amount of noise. All or nothing seems to work best. (Dimmers use voltage choppers that generate tremendous amounts of hash on the AC power lines.)

While modifying your cordless telephone base transponder may or may not be legal, many manufacturers have long-wire antenna kits that get you away from the AC power lines. This generally works well because you are now isolating your base transponder transmitting system from your house wiring. Drop me a self-addressed stamped envelope and I will include information on manufacturers of long-wire antenna systems.

Another type of interference is encountered when there is another cordless telephone on the same frequency. Does your handset now and then give a quick squawk or two with no one on the line? If this is the case, chances are you are encountering interference from another system on the same frequency. Pushing down your handset telescopic antenna won't cure this problem. Within your handset is a separate antenna for receive—a loop stick antenna. You are simply picking up stray signals from other cordless phones.

If you can figure out whose phone it is, convince them to change the location of their transponder to minimize interference. Have them coil up their transponder power



A range extender can significantly increase the coverage of your cordless phone.

The Clandestine Confidential Newsletter

A new publication devoted to clandestine stations and programs, *The Clandestine Confidential Newsletter* is designed to keep you up to date on this intriguing aspect of short-wave listening and DXing.

C-C-N will be published six times a year, beginning with the February, 1984 issue. It will contain the latest frequency and schedule information, monitoring data, background information, addresses, and features on new and old stations.

C-C-N will serve as a continuing updater to the new book *Clandestine Confidential*, being published by Universal Electronics.

Subscriptions to C-C-N are \$10.00 per year in North America, \$13.00 overseas, payable in cash, check or money order.

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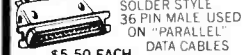
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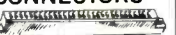
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cord in a tight circle to minimize long-distance radiation. Remember, you are picking up their signals on a common AC power line. When all else fails with same-channel interference, consider changing channels.

If you find that the party on the telephone is hearing two conversations, you can sometimes minimize this by lowering the base transponder telescopic whip. This will decrease the amount of range from a distant handset while probably not significantly decreasing the reception range to your nearby handset. Sometimes moving your own base transponder to a new AC outlet and phone jack will help.

The best thing that you can do to help minimize interference is to experiment with new locations of your base transponder or homemade antenna systems. Be careful when modifying your base transponder transmitted signal because there are high voltages where it's now connected. If you do go for one of those new long-wire antenna kits, make sure your transponder is turned off before making the modification. Always be sure to use insulated wire, too. No sense burning down your house for just a little extra range.

When all else fails, sell your present 1.7 MHz/49 MHz system to a neighbor you don't like and buy yourself one of the new 46 MHz/49 MHz systems that don't use the AC power lines as an antenna. Here you'll find the quiet reception that you really want while placing and receiving cordless telephone calls.

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RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE

More Radar Detectors Disappearing

It looks like radar detectors have been a hot item in Burlington, Vermont. More than 50 detectors have been stolen from cars there and police expect the count to rise before they get a handle on the thefts, Burlington police Lt. James Scott said.

Two juveniles were apprehended for stealing radar detectors, but the thefts have continued, Scott remarked.

If the car doors are locked, thieves break into the cars by using a screwdriver to pry back a car window until it shatters, he elaborated. They then snip a wire and remove the electronic device.

Scott said many people are doing the stealing and police do not have any leads on the thieves.

Grand Ridge, Illinois Retains Its Reputation For Trapping Speeders

Grand Ridge lived up to its reputation as a speed trap last year. Relative to its population, Grand Ridge took in more than twice as much money in traffic ticket payments than any other city in LaSalle County in 1983, statistics released by LaSalle County Circuit Clerk Dale Stockley show.

Traffic violation payments equal to \$43 for each of the village's 684 people were collected by the municipal police force from Dec. 1, 1982 through Nov. 30, 1983. That translates into a figure of \$29,479 for traffic violations.

After Grand Ridge, the next ten cities and their respective per capita dollar figures are: Cedar Point, \$43; Tonica, \$10; Utica, \$8; Sheridan, \$7; Marseilles, \$6; Mendota, \$6; Peru, \$4; La Salle, \$4; Leland, \$4; and Ottawa, \$4.

Grand Ridge Police Department head Sgt. Harold Carroll said his force writes a heavy volume of tickets because so many people refuse to recognize Grand Ridge as a town and the speed zone as legitimate.

Carroll said he doesn't mind that reputation; in fact, he rather enjoys it.

"The reputation helps us slow the traffic down," he noted.

Virginia Troopers Adopt Sporty Look

State police call them "non-conventional" patrol cars, but motorists stopped for speeding or other violations may have more colorful terms for the sporty, unmarked cars used by some troopers.

Trooper E.R. Slayton, who has patrolled in a sleek white Mustang with black trim, said the reaction of drivers he has stopped is "mostly shock."

"You've had a few say this is getting awful



sneaky," he said. "You catch people unaware. In a police car, as soon as you go around them, they start obeying the traffic laws."

This year, state police troopers are driving Ford Mustang GTs and Chevrolet Camaro Sport Coupes.

Each of the state's seven state police districts has one of the sporty cars, and they are moved about the state frequently so drivers won't learn to spot them.

While the state police's 1,036 other patrol vehicles handle a variety of duties, the sports cars stick to cruising the highways for traffic violators seven days a week.

State police have been patrolling in unmarked cars since 1957. In past years, the standard unmarked car was a drab black economy sedan.

Marked and standard unmarked patrol cars rely on radar to trap speeders, but the sports cars just follow a motorist and pace his speed.

Delaware Town Caught In Its Own Speed Trap

Fenwick Island, Delaware, is one of those municipalities you might drive right on through without even realizing it. Until it's too late. Too late is when the wail of a police siren announces you've just become another victim of that bane of interstate motorists; a small town speed trap.

At the southeastern tip of Delaware, Fenwick Island has profited nicely from its location along which is a shortcut to Ocean City, Maryland.

Hundreds of drivers get nailed that way every summer, and the town is so confident of the bounties that \$40,000 in anticipated

revenue from traffic fines is built into its annual budget of \$272,000.

But because one victim finally decided to fight back, Fenwick Island is experiencing what it's like to get nailed.

Abraham Korotki, an attorney from Towson, Maryland, was on his way to some fun in the sun at Ocean City when he got nailed. Not only was he not speeding, Korotki protested, but he was already in Maryland, not Delaware, when the Fenwick Island patrol car stopped him. Worse yet, he said, the patrolman pointed a gun at his passenger.

That was in 1976, but Korotki was a persistent fighter. Rung by rung, he argued his way up the judicial ladder until a federal jury recently awarded him \$100,000 in punitive damages, plus \$10,000 for legal fees.

Now Fenwick Island is seeking a reversal, with attorney James Phillips claiming the amount of the judgment "may well exceed the town's assets."

"There's not much here," says Phillips. "Just a small building that houses the town hall, the alderman's court and the police department, plus a couple of patrol cars."

But Korotki rejects the notion that the vindication he spent almost eight years fighting for would mean financial ruin for the town.

"Fenwick Island is one of the richest communities around," Korotki argues. "The land values of those ocean-front properties are skyrocketing. The last house sold there just went for \$500,000, and there's not a citizen of that town who isn't sitting on at least \$100,000 worth of real estate."

Nor does Korotki buy the legal argument, currently before a federal judge, that a municipality like Fenwick Island can not be held liable for punitive damages in a civil case

because that would place an unfair burden on its taxpayers.

"What's unfair about it?" he asked. "They voted in the mayor, the city council and those so-called aldermen who decide the fate of out-of-state motorists.

"They all new it was a racket when they were benefiting from it. Why should they be let off the hook now?"

Korotki pointed out that his long legal fight involved 15 court appearances, and that his case was upheld at every stage of the judicial process until it reached the federal jury, which awarded him the damages.

"The idea that a judge can modify, reduce or take away what the jury awarded is wrong," he said, "because it undermines the very purpose of trial by peers."

But if the federal judge does set aside the award, Korotki says he's prepared to carry his fight to the Supreme Court.

"I've already run the length of the football field with this thing," he noted. "To take it to the Supreme Court would just be another five years."

Call For "Fair Play" Fails In Ticket Case

The county executive wasn't in court for speeding recently, but Erin McGee was, and her only defense was an appeal for fair play as she pointed out the discrepancies in the way police handled her case and his. It didn't get her case dismissed, but it did help reduce the fine.

Ms. McGee of Crofton, Maryland was stopped and ticketed for traveling 22 mph over the speed limit. A few hours later, County Executive O. James Lighthizer was stopped at the same radar trap by the same officer and received only a warning, although he was clocked at 26 mph over the speed limit.

Lighthizer's warning did not carry a fine; McGee's ticket carried a maximum \$50 fine.

District Court Judge Donald M. Lowman reduced her fine to \$15 and one point on her license.

While Ms. McGee was relieved about paying only \$15, she still maintains that justice wasn't dished out equally to the county executive.

"It's better than \$50," she said, "but I still think it's unfair—because he got off."

Fuzzbuster® Bait Lead To Fuzz Bust!

The Covington, Kentucky police went fishing recently for thieves and hooked three suspects. The bait was a radar detector, namely a Fuzzbuster®.

For several weeks, Covington has been suffering a rash of radar detector thefts from cars. To catch the perpetrators, police have been parking an unmarked detective car with a radar detector in it, then watching and waiting.

"Three people broke out the window in our nice new car," Lt. Tom Henry said.

Police arrested three Covington men and charged each with receiving stolen property

over \$100 and theft over \$100, both felonies. The men also were charged with criminal mischief, a misdemeanor.

Henry said the baited car technique is one that doesn't work without a little luck. "Everything has to jell," he said. "You have to have it there. The people that want it have to be there. The weather has to be good. Traffic has to be down. There's a lot of iffy's."

Chief Orders Radar Units Out Of Cars To Avoid "Speed Trap" Image

"I do not want Williamson, West Virginia to get a bad name or a reputation for being a speed trap for motorists." Williamson Police Chief W.C. "Jolly" Smith said that was the reason "I ordered radar units removed" from the city's police cruisers.

The police chief said he had received some complaints from Williamson merchants that the issuance of speeding tickets was not helping the business segment of the city.

"Some of these police officers may be overdoing it a bit in their issuing of speeding tickets," Smith said. His order to pull the radar from cruisers came following an incident in which political candidate Ethel Pollis was clocked at 37 mph in a 25 mph zone.

The radar units were placed atop some filing cabinets in the police station but Smith gave assurances that the radar would be used on weekends to spot check vehicles.

After receiving the ticket, Ms. Pollis denied speeding and said, "I wonder if I'm being harassed?"

Chief Smith denied any harassment. But the chief admitted he was concerned that Williamson might acquire a reputation as a speed trap.

Dane Floors Judge With Speeding Excuse

A Danish visitor whose car was clocked by Minnesota State Patrol radar at 132 miles per hour told the court that he was used to driving on the autobahns of Europe, where there is no speed limit.

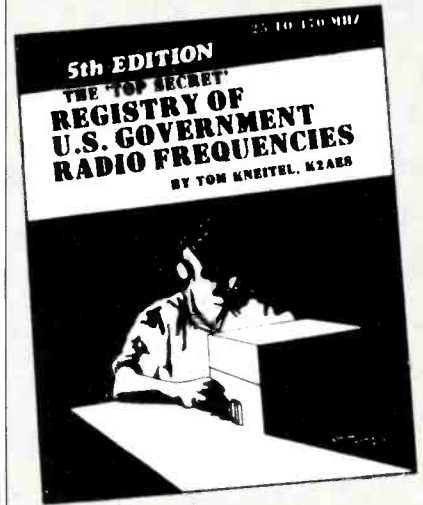
Hans Erik Ribberholt also explained through an interpreter that he didn't stop because fog was so heavy he was unaware that his car was being pursued.

Trooper Keith Williamson said the 30 mile chase on Interstate 94 began after another patrolman's radar showed Ribberholt's Mercedes Benz was traveling over 90 miles per hour. The trooper was unsuccessful in overtaking the car, so he radioed for help. Williamson got into the chase and clocked the Ribberholt car at 132 mph.

In court, the Dane was asked if he had floored the accelerator. He said he hadn't adding that the car was capable of about 145 mph. Ribberholt said he also owns a Ferrari, which has been clocked in Europe at as high as 160 mph.

Judge Paul Ballard listened to Ribberholt's explanation and explained to the man that he had exceeded the U.S. legal speed limit of 55 mph by 77 mph. The judge then proceeded to fine Ribberholt \$330. **PC**

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LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

We are, forgive the expression, "jammed" with letters and reports this month, so it is almost a good thing that we don't have a lot of new station activity to pass on this time.

We can tell you, however, that the new Radio France International relay station is on the air from French Guiana. Currently only one of the transmitters is in use and is being heard quite regularly and very strong on 15.180 from around 2200 to 0100 GMT. Broadcasts are to Latin America in French, Spanish, and Portuguese but no identifications specifying French Guiana have been heard here. Thus you may have to guess at whether you have the station based on schedule, strength, and language used. Reception reports go to Radio France International, B.P. 9516, Paris Cedex 16, France.

Get set for ANARCON-84, this year's convention of the Association of North American Radio Clubs. It'll be held from July 20-22 at the Ramada Renaissance Hotel in Toronto, Canada. The event includes exhibits, a wine and cheese reception, numerous talks by well known DXers (including one on "Planning a DXpedition"), a seminar by Bob Grove of Grove Enterprises, the famous Handicapped Aid Program auction, tours of Station CRFX and Toronto Harbor, and the traditional Saturday night banquet and International Broadcaster's Forum featuring a number of international broadcasting stars.

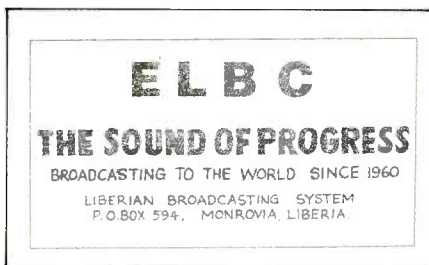
It's three full days of fun and interesting activities and we strongly recommend you attend if at all possible. For a convention kit and registration form write to The ANARC Convention Committee, Box 232, Postal Station "Z," Toronto, Ontario M5N 2Z4 Canada.

Stewart MacKenzie informs us of another meeting of Southern California Area DXers (SCADS). This meeting is from 9 a.m. to 4 p.m. July 21 at the Village View School in Huntington Beach, California. Many international broadcasters attending the Summer Olympics will be there, as will DXers from near and far. For more information, send an SASE to SCADS, 3809 Rose Avenue, Long Beach, CA 90807-4334.

There's a new club getting organized. It's the New York DX Association and it's a bit unusual in that its focus is to specialize in the problem of DXing from a large city, i.e. reception, antenna and landlord problems. Sample bulletins may be had for 25 cents or two IRCs from The New York DX Association, 4103 Fort Hamilton Parkway, Brooklyn, NY 11219, attention Greg Baker. Questions about the club can be phoned to (212) 853-1429 between 2300-0200 GMT. And, a DX Hotline can be reached at (212) 981-4866.



This fabulous shack belongs to John R. Tow in Pinson, Alabama.



Stephen C. Behrendt of Lincoln, Nebraska owns this nice QSL from ELBC in Liberia.

Mailbag

Let's check the mail.

E. E. Dye of Russellville, Arkansas forwards his SWL/QSL card and notes that he's been in radio off and on since 1937 and is active in almost all areas. He uses a Realistic DX-100 and DX-160 with an "Astro Plane" omnidirectional, vertical antenna which he says works well on all bands.

David Eaton in Hulga, Alabama asks about our deadlines. Usually it's around the 15th of the month David, but it varies a bit depending upon other commitments. It's best to send reports via POP'COMM headquarters. Dave was using a Realistic DX-200 but has replaced that with an ICOM R70 with which he is very pleased. He's been listening since about 1970.

David Keenan of Northridge, California is another "old timer" with 25 years of listening on his log. Right now he's using a Panasonic RF-4900 with an Autek QF1-A filter.

Ted Damick, a New Hampshire school librarian, says POP'COMM plus a shortwave receiver is all that's needed to get his high school students bitten by the bug. He brings

the radio to school along with issues of POP'COMM every so often. Ted says "it does wonders."

Stephen C. Behrendt of Lincoln, Nebraska wonders about QSLs from Radio Clarin in the Dominican Republic. So do a lot of people, Stephen. Some seem to get replies with no trouble while others must wait literally years. Like so many other such cases we can't suggest much more than just "keep trying." It might help to send your report to the attention of the station's star announcer, Rudy Espinal, but we don't guarantee anything! As for the noise problem you mention, it sounds like power line noise so you might want to check with your local electric utility.

R. E. Larson, Senior, in Hector, Minnesota notes that shortwave listening is the cure for that wintertime condition known as cabin fever. R. E. uses an FRG-7700 and, in addition to SWBC, monitors the hams, river, air, and cruise ship traffic.

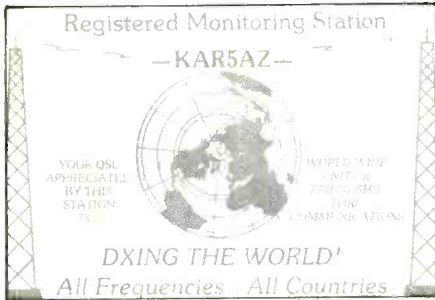
Another FRG-7700 is in the shack of Thomas Daly of Pamona, New York who was active in the mid-1960s and is now back at the dials again.

Stephen Clement of Sonora, California wants the address of SPEEDX. SPEEDX can be reached at P.O. Box E, Lake Elsinore, California 92330.

Gerald R. Brookman of Kenai, Alaska uses a Kenwood R-600 with a 75 foot long-wire. He wonders if anyone can identify a station he hears on 2.850 between 0800 and 0900, believed to be in Russian. Gerald would be happy to send a cassette of his reception to anyone who'd like to take a crack at getting an ID. His address is P.O. Box 4663, Kenai, Alaska 99611.



Harry Seiferheld of Ronkonkoma, New York fills time during retirement at this shack which includes Lafayette, Bearcat, and Hallicrafter receivers among others.



This QSL/SWL card belongs to E. E. Dye of Russellville, Arkansas.

Jerry Reichman in Seattle, Washington was active in the 60's and 70's from Chicago. Now he's back in the 80's from the northwest. He notes a big difference in reception compared to the midwest with Europeans suffering and Asia and the Pacific doing much better on his vintage 1936 Zenith Transoceanic.

Randy King of Lincoln, Nebraska recommends the various booklets on listening that are available from the Media Network program of Radio Netherlands. A free catalog of the pamphlets and info sheets available can be had by writing to Media Network, Radio Netherlands, P.O. Box 222, 1200 JG Hilvesum, The Netherlands.

Another QSLing question comes from Carolyn Moore of Sherman, Texas who wonders how many IRCs should be included in reports. That's a toughie. It varies anywhere from one to four. Sometimes, particularly with stations in communist countries, none at all are needed. In some remote areas they aren't even exchangeable at local post offices. You might be better off using mint stamps of the country to which you're writing. These are available from The DX Stamp Service, 7661 Roder Parkway, Ontario, New York 14519. Send a self addressed stamped envelope for a price list.

John R. Tow of Pinson, Alabama has a shack that looks like a receiver store. Included are a Bearcat 210XL scanner, Drake SPR4, Drake R4C, ICOM R70, Yaesu FRG-7, and a Collins R390A, all surrounded by a host of associated equipment.

Listening Reports

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

Albania Radio Tirana, 7.065 at 0003 with news by woman. (Wright, MA) 7.120 at 0230 in English with news at 0236. (McDonough, PA) 7.065 at 0115 in English with politics and music. (Hefflin, VA)

Angola Radio Nacional Angola, 9.535 at 2240 in French, talk by man, music. (Paszkiwicz, WI) 9.660 in Portuguese at 1900. (Wood, Saudi Arabia)

Antigua Deutsche Welle Relay in Spanish at 0300 to Latin America on 11.785. Also in English to North America on 9.540 (Unruh, HI)

Australia Radio Australia on 11.910 at 0710, 11.790 at 1500. (Noak, IN) 6.045 at 1130-1145 believed beamed to Asia. (Pastrick, PA)

ABC Brisbane on 4.920 with domestic service at 0830. (Brock, WI)

VNG time station at 0845-0900 on 4.500. (Bonk, WI)

Austria Austrian Radio on 9.545 at 0126 with music and "Report from Austria" at 0345 and English service sign off. (Daly, NY)

Belgium Brussels Calling, BRT on 5.910 at 0022 with news by man. (Wright, MA) At 0030 with "Radio World." (Paszkiwicz, WI)

Benin Contonou, 4.870 all French with news of West Africa until 0610 then into music. (Bonk, WI)

Botswana Radio Botswana, 4.848 at 0356 sign on with interval signal, anthem, man with frequency, local and English religious program. (Hickerson, AR)

Brazil Radio Bras on 15.290 at 0230 to 0300 in English to North America. (Pastrick, PA)

Radio Inconfidencia, Belo Horizonte, 15.190 with a variety of music from sambas to soul, only occasional talk in Portuguese. Local evenings. (Eaton, AL)

Bulgaria Radio Sofia, 11.720 at 2324 in Spanish. (Wright, MA) 9.665 at 2130. (Simons, OH)

Cameroon Radio National, Yaounde, 1900 on 9.745 in French with old French music, ID, news in French. (Wood, Saudi Arabia) Occasionally in the clear in English from 2045 to 2115 with French around 2120. (Tow, AL)

Canada Radio Canada International, at 1324 on 9.575 in French. (Pastrick, PA) 5.960 in English at 0032. (Wright, PA)

Chile Radio Nacional on 15.150 fading out by around 0230. Usually a lot of local pop music but occasionally has "futbol." (Eaton, AL) 15.140 and 7.570 with some 50's and 60's rock music from 0100 to 0200 in Spanish. (Tow, AL)

China Radio Beijing in Hindi at 1545 on 7.620, at 1600 on 9.457 in Swahili, in Russian at 1700 on 7.700. (Wood, Saudi Arabia) In English at 0000 on 11.860, 0100 on 11.655. (Collins, AR)

Republic of China/Taiwan Voice of Free China via WYFR on 5.985 at 0216 with music of China. Interference from South Africa and Roumania. (Wright, MA) At 0337 in Chinese. (Daly, NY) Good at 0200 on 15.225. (McDonough, PA)

Clandestine La Voz del CID, 11.100 with light pop music around 1900. (Eaton, AL) Varies to 11.101.5 and there's considerable confusion at present as to which service this is. (Editor)

Bizim Radio, 9.584 at 0400 in Turkish with interval signal and sign on, into news. (Wood, Saudi Arabia)

Voice of the Islamic Revolution in Iraq, from Iran, on 7.230 at 1800 in Arabic. Frequency usually carries Voice of Islamic Republic of Iran. (Wood, Saudi Arabia)

Voice of the Broad Masses of Eritrea on 6.306 at 1545 in Eritrean with interviews. Free of jamming. (Wood, Saudi Arabia)

Voice of the Sudanese Popular Revolution on 17.940 at 1625-1655 in Arabic. (Hickerson, AR)

Voice of the Libyan People, heard on 11.370 at 1850-1915 in Arabic, with identification at 1900. (Hickerson, AR)

Colombia La Voz de Huila, Neiva, heard at 0830. (Duckworth, CO) Radio Impacto. Costa Rica usually here but occasionally off. Not aware of any Nicaraguan here which would create interference as you mention. (Editor)

Costa Rica TIFC on 5.055 at 0315 to 0355 sign off with national anthem. There was also some religious talk and music. (Wright, MA)

Cuba Radio Havana on 11.760 at 0510 promoting the Sandinistas. (Wright, MA) On 6.090 at 0230 with world news, anti-U.S. comments. (Daly, NY)

Czechoslovakia Radio Prague, English talk on U.S. interference in Nicaraguan internal affairs at 0540 on



The attractive QSL of Radio Korea, sent in by Jerry Collins of North Pole, Alaska.

6.055, and at 0100 on 5.930 with ID, schedule in English. (Wright, MA)

Ecuador HCJB on 21.477.5 at 2145 with "DX Party Line" on a Monday. (Freeman, FL) 9.745 at 0400 with ID and "Look at Latin America." (Daly, NY) 6.130 with "DX Party Line" at 0945. (Hefflin, VA)

CRE, Radiodifusora del Ecuador from Guayaquil on 4.655 in Spanish at 0300 with music, news, interviews. News at 0330 sponsored by Banco Continental. (Behrendt, NE)

Egypt Radio Cairo on 9.475 at 0250 with "Mohammed, Prophet of Islam" to 0300, then Arabic music, news headlines at 0315. English sign off at 0328. (Daly, NY) At 0230 with news in English. (Hefflin, VA)

England BBC on 5.975 at 0012 with news items. 9.590 at 2346 with program on recent WARC Conference. (Wright, MA) On 3.955 at 0715. (Bonk, WI)

Falkland Islands Falkland Islands Broadcasting Service with British Top 40 program from 0245 to 0400 sign off on 2.380. (Tow, AL)

Finland Radio Finland on 17.800 with "Sunday Best" at 1330 to 1530 on Sundays. (Behrendt, NE) 1430 on 15.400. (Simons, OH)

France Radio France International at 0415 on 9.545 with news in English. (Hefflin, VA)

French Guiana Radio France International testing its new relay station in different languages on 9.790 and 15.180 from 2200 to 2300, closing in French. (Tow, AL)

Greece The Voice of Greece on 9.420 and 9.865 at 0310 in Greek with local music. (Daly, NY)

Greenland Gronlands Radio, 3.999.1 at 1024 to 1055 with country-western music, woman announcer, interval signal, identification by man, into pop music. (Hickerson, AR)

Guyana Guyana Broadcasting Corporation, 5.950 at 1000 with news in English. (Hefflin, VA)

Hungary Radio Budapest, 9.520 at 0300 with English to North America after sign on. (Daly, NY)

India All India Radio, Madras site listed, 1300 on 7.235 in South Indian language. ID, film music, commercials. (Wood, Saudi Arabia) AIR Delhi on 10.335 at 1520 to 1540 in English with time pip and ID at 1530. (Hickerson, AR) On 15.320 from 1000 to 1100 with news, features, Indian music. (Collins, AK)

International Waters Voice of Peace, 6.240 at 0305 to 0340 with pop music, English ID, local time as 5:30, announced medium wave parallel to 1540 kHz. (Hickerson, AR)

Iran Voice of the Islamic Republic of Iran with English at 2000 on 9.021. Poor. News and commentary, complaints of jamming. (Lima, MA)

Iraq Radio Baghdad, 9.610 at 2215 in English with Arabic music, address, schedule, and sign off. (Paszkiwicz, WI)

Sawt ul Jama'ah, 0415 on 15.400 in Arabic with identification, choral patriotic music. (Wood, Saudi Arabia)

Israel Kol Israel, 7.410 at 0230 with Spanish to Latin America. (Daly, NY) 7.410, 9.815, and 11.655 at 0000, 0100, and 0200. (Simons, OH) Home service in presumed Hebrew after 0500 on 11.590. (Eaton, AL)

Ivory Coast Abidjan in French on 4.940 at 0645. (Bonk, WI)

Japan NSB at 0906 on 6.055, at 1138 on 9.595. (Duckworth, OH)

Far East Network with the "Charlie Tuna Show" at 0030 on 15.260 (Unruh, HI)

Radio Japan on 17.820 in English, 0200-0230, then into Spanish. (Collins, AK)

Kenya Voice of Kenya on 4.934 at 0400 in Swahili, parallel to 4.915. (Wood, Saudi Arabia)

Kuwait Radio Kuwait, 11 657 in English at 1920 with French ballads, woman announcer. (Paszkievicz, WI)

Lebanon Voice of Hope, 6 215.8 at 0440 to 0515, easy listening music, news by man in English at 0450, Bible verse and identification. (Hickerson, AR)

Lesotho BBC Relay station at 0355 on 9.515 in English with Bow Bells, ID for BBC Atlantic Relay Station. But it is actually an off-the-air relay of Ascension, including the relay IDs. Misleading. (Wood, Saudi Arabia) A relay of a relay! (Editor.)

Libya Radio Jamahiriyah, 11 816 at 2225 with revolutionary talk and quotes from Khadafy and talk about third world protests of U.S. Naval Base on Diego Garcia. (Daly, NY)

Luxembourg Radio Luxembourg, 15 350 in French, with British and European Top 40, advertisements, and "WLKN" jingles. (Paszkievicz, WI)

Malawi Malawi Broadcasting Corporation, 3 380 with vernacular, perhaps Chichewa, occasional English announcements after around 0300. Poor with a lot of fading. (Behrendt, NE)

Malaysia Radio Malaysia, Kuala Lumpur, on 6.025 at 1600 in Chinese with traditional Chinese music, identification in Chinese, choral anthem, and sign off. (Wood, Saudi Arabia)

Mauritania Radio Mauritania, in Arabic from 2245 to 0015 on 4.845. (Tow, AL)

Mexico Radio Huayacocotla, on 2.390 with program on El Salvador, heavy noise, weak signal, all Spanish. Heard around 0110. (Eaton, AL)

Radio Mexico International on 15 430 around 0130 in Spanish. (Eaton, AL)

Morocco Radiotelevision Marocaine on 15 338.5 at 1800 in Arabic, parallel to 17 815 and on 15 360 at 1700 in Arabic, parallel to 15 334 and 17 585. (Wood, Saudi Arabia)

Mozambique Radio Mozambique, Maputo, 11 815 with 0430 sign and wake up service in Portuguese. Local music, commentary. (Eaton, AL)

Nepal Radio Nepal on 5 005 in Nepali 1250 to 1310 with news, identification, and some songs by a woman. (Hickerson, AR)

Netherlands Radio Netherlands with "Feedback" program at 0530 heard on 9 715 and 9 895. (Freeman, FL) 9 715 in English 0550 to 0600. (Wright, MA) 9 590 via Bonaire. (Editor) 0230 to 0325 with "Wednesday Report" and "Dutch Diary." (McDonough, PA) 17 605 with "Happy Station" at 2045 to Africa. (Unruh, HI)

Nicaragua La Voz de Nicaragua on 5 950 with anti-American propaganda in English at 0430. (Pastrick, PA) 0350 in Spanish with news in English at 0400. (Daly, NY) English to 0200, Spanish following. (Behrendt, NE) 0138 to 0140 in English with interference from Austria. (Wright, MA)

Nigeria Voice of Nigeria, 15 120 at 2135 with African news, local news. Sign off at 2200. (Daly, NY)

FRC Kaduna at 0420 in Hausa with identification, Nigerian music, on 6 090. (Wood, Saudi Arabia)

North Korea Radio Pyongyang, English at 1700 on 9.625 with interval signal on sign on. Interference from jamming. (Wood, Saudi Arabia)

Pakistan Radio Pakistan in Dari at 1530 on 7 315. This to service to Afghanistan although not mentioned in the WRTH. On 11 670 with English dictation-speed news from 1600 sign on to 1616 sign off, parallel to 17 660. On 15 235 in Tamil at 0855. Koran and news from 0900. (Wood, Saudi Arabia)



Mike Garrison of El Cajon, California with son Dave and his Hammarlund HQ-145 and Kenwood R-2000 receivers.

Papua New Guinea Port Moresby on 4 890 at 0900 with news and weather. (Bonk, WI)

Peru Radio Los Andes, Huamachuco, 5 030 at 0929 in Spanish. (Duckworth, CO)

Radio Andina, Huancayo, at 0914 in Spanish with local music on 4 995.8. (Hickerson, AR)

Qatar Qatar Broadcasting Service, Doha, 9 905 at 1358 to 1402 with music and man with identification in Arabic. (Hickerson, AR)

Roumania Radio Bucharest, 5 990 at 0220 with news by a woman. (Wright, MA) On 11 810 at 0428 with sign off of English to North America. (Daly, NY)

Saipan The news KFBS heard from 2345 to 0000 at a poor level on 15 125. (Lonsdale, AZ)

KYOI in Japanese and English at 1925 on 9 670 with rock, to fade out at 2033. (Unruh, HI)

Saudi Arabia Broadcasting Service of the Kingdom of Saudi Arabia, heard in Arabic at 0500 on 11 685 (Eaton, AL)

Senegal O.R.T., Dakar on 4 890 in French from 2200 to 2300. (Tow, AL)

Seychelles FEBA at 1805 on 11 780 in Oromo, an Eritrean language resembling Somali, religious program in parallel to 15 410. Off with identification and interval signal. (Wood, Saudi Arabia)

Solomon Islands SIBC on 9 545 in English at 0600 with BBC World News and request show, then part one of "Treasure Island" at 0630. (Unruh, HI)

Somalia Radio Mogadishu, 6 095 at 1545 in Swahili, horrendous, cracked modulation, unintelligible as is often the case. (Wood, Saudi Arabia)

South Africa Radio RSA, 5 980 at 0150 with interval signal, interference from Voice of Free China via WYFR on 5 985. (Wright, MA) 11 730 at 0230 with news and

commentary. (Moak, IN) 15 180 at 2100 in English to Europe. (Lima, MA)

South Korea Radio Korea in English at 1015 on 5 975 with "Shortwave Feedback" and woodpecker interference. (Unruh, HI) 15 275 at 2230, 15 575 at 0200. (Collins, AK)

Southwest Africa/Namibia Radio Southwest Africa, in their all night service on 3 295 heard from 0200 to well past 0400. Identifications in English, Afrikaans, and possibly German. (Behrendt, NE)

Spain Radio Exterior de Espana, 9 630 in North American Service. (Pastrick, PA) Time? (Editor) 6 155 at 0140 in Spanish and French. (Wright, MA)

Sri Lanka S.L.B.C. on 15 425 at 0200 with the English All Asia Service. Religious program prior to 0200. (Credit misplaced, Editor)

Switzerland Swiss Radio International, 6 135 at 0145 with interval signal and opening of broadcast to North America. (Wright, MA)

Tahiti Radio Tahiti, 11 825 at 0410, local music to 0425, talk in Tahitian to 0430 fade out. (Daly, NY) 6 135 at 0635 in French with Polynesian music. (Higi, AK)

Thailand Radio Thailand, 9 650 at 1307 to 1316 in English with ID by man, then into music. Weak signal. (Hickerson, AR)

Tunisia Radio Tunisia, 7 225 at 0520 in Arabic, with Koran. (Paszkievicz, WI)

Uganda Radio Uganda, 5 027 with some home service, English news to 0415, frequent IDs, into possible Swahili, and news again. (Bonk, WI)

Ukraine SSR Radio Kiev, English at 0307 on 15 100 with news and commentary. (Higi, AK) Via USSR transmitters. (Editor)

Unidentified 9 530 at 2325 with man in Spanish. (Wright, MA)

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2-3R

CIRCLE 27 ON READER SERVICE CARD

Something sounding like "Evrow Radio North America" on 6.110 to 2115 sign off. Gave an address in Toronto. (Tow, AL) Perhaps IBRA Radio, via Malta. (Editor)

5.995 in French to abrupt sign off at 2155. (Tow, AL) **United Arab Emirates** Radio Dubai, 0350 on 11.730 with a DX-oriented mailbag program, parallel to 15.435. (Wood, Saudi Arabia)

United States WYFR Family Radio on 9.535 at 1300 with religious program and question and answer program. (Pastrick, PA)

WRNO with Radio Earth at 0400 to 0500 on 6.185. (Pastrick, PA) At 0222 on 6.120 with rock, weather, commercials. (Wright, MA)

Voice of America on 26.040 at 1830 with African pop music, English-speaking disc jockey. (Freeman, FL) On 5.995 at 0537 with "Breakfast Show." (Wright, MA)

AFRTS on 11.790 at 0531 with sports and some news. (Wright, MA)

La Voz de la OAS (Organization of American States, via VOA facilities, Ed.) on 9.565 in Spanish at 2345 with music and news. (Paszkiwicz, WI)

USSR Radio Moscow on 9.700 at 0330 to North America with commentary by Vladimir Posner. (Pastrick, PA) 7.185 at 2320 with news and commentary in English. 9.765 at 0548 in English. (Wright, MA)

Mayak service from Petropavlovsk on 4.485 fading in around 0600. Identification by woman at 0615 and chimes. (Eaton, AL)

Vatican Vatican Radio on 6.015 at 0110 with woman in English. Interval signal at 0115. (Wright, MA) On 9.650 at 0210 with news in English to India and South-east Asia. (Daly, NY)

Venezuela Ecos del Torbes from San Cristobal on 4.980 until 0400 sign off. Music and ads for Cardeco Construction. (Behrendt, NE)

Vietnam Voice of Vietnam with English sign on at 1600 on 15.010, into "Sunday Show." (Wood, Saudi Arabia)

West Germany Deutsche Welle, at 0500 in English on 5.960. (Pastrick, PA) 9.645 at 0130 with English-German lessons. (McDonough, PA) 15.150 at 1945 with "Windows of the World" and news. Also on 9.640 at 0250 in Spanish to Central and South America. (Daly, NY) 6.145 in English with human interest stories. 6.085 at 0116 with pop music and talk in English. 5.960 at 0530 also in English. (Wright, MA)

Bayerischer, Rundfunk, Munich, strong on 6.085 at 0835-0856, in German with identification, pop and German music. (Hickerson, AR)

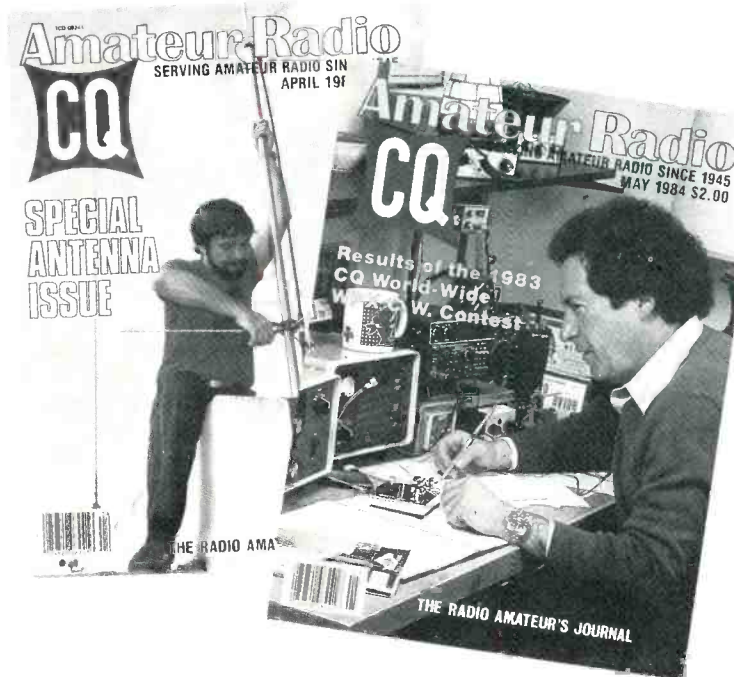
Yemen Arab Republic Radio San'a, 9.780 in Arabic with identification at 0330, part of which is "jumhuriyah al Arabiyah al Yamaniyah." (Eaton, AL)

Your reports, comments, questions, good high-contrast copies of QSLs or other station items, shack photos in black and white or color, program schedules, and what-have-you are always welcome. We look forward to hearing from all of you every month. It is your column and you are the people who get the job done!

Sincere thanks and a tip of the hat to: John R. Tow, Pinson, Alabama; Gary Hickerson, Ft. Smith, Arkansas; David Eaton, Mulga, Alabama; George W. Heflin, Manassas, Virginia; Dr. Richard E. Wood, Abha, Saudi Arabia; Jerry Collins, North Pole, Alaska; Donald R. Unruh, Ewa Beach, Hawaii; Tom Lima, Sr., Saugus, Massachusetts; John Higi, Anchorage, Alaska; Daryl E. Duckworth, Loveland, Colorado; Joe Simons, Sherwood, Ohio; Thomas Daly, Pamona, New York; Peter Bonk, Madison, Wisconsin; Sheryl Paszkiwicz, Manitowoc, Wisconsin; Jim Lonsdale, Phoenix, Arizona; Joe Wright, Boston, Massachusetts; Pat McDonough, Pittsburgh, Pennsylvania; Randy Noak, Crownpoint, Indiana; Rick Freeman, Orlando, Florida; Stephen Behrendt, Lincoln, Nebraska; Richard Pastrick, Conway, Pennsylvania.

See you next month. Till then, good listening! **PC**

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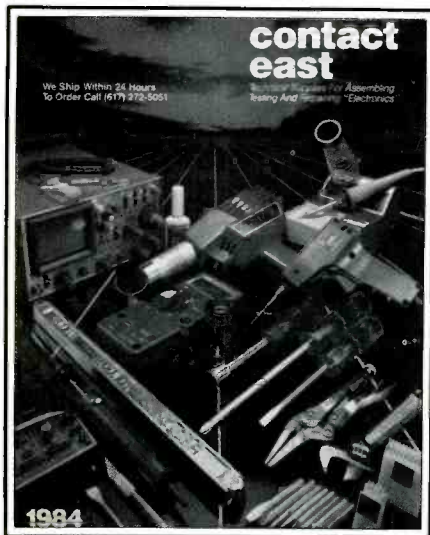
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PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Free Tool And Instrument Catalog

Contact East is offering a free 1984 electronic tool and test instrument catalog, featuring over 5,000 quality technical products for assembling, testing, and repairing electronic equipment. This is an excellent buying guide for engineers, technicians, and researchers.

Products include precision hand tools, test instruments, tool kits, soldering supplies, plus a new, full selection of static control products. All products are fully illustrated with photographs, detailed descriptions, and pricing to allow for easy ordering by phone or mail. Most orders are shipped within 24 hours and carry a 100% satisfaction guarantee.

The Contact East 1984 Catalog is available free from Contact East, 7 Cypress Drive, PO Box 160, Burlington, MA 01803 (617) 272-5051.

Programmable 10-Channel Scanner

Regency Electronics, Inc., (Indianapolis) now offers a 10-channel programmable scanner with advanced features—including a little extra help during programming. The Regency Z10 is available for \$229.95 (suggest U.S. resale) at participating Regency Electronics dealers.

The Regency Z10 covers six complete VHF and UHF frequency bands for access to thousands of police, fire, public service, business, commercial, and amateur radio frequencies and channels. Selected frequencies from any band are easy to program into the scanner's memory; the Z10 can scan the frequencies in its memory or search the bands for whoever happens to be there.

The Z10 can scan its 10 channels in 2/3 of



a second. Searching its three VHF bands, it can cover 1 MHz (200 frequencies in 5 kHz increments) in about 17 seconds; on its three UHF bands, it can search 1 MHz (80 channels in 12.5 kHz increments) in about 6 seconds. An automatic priority control checks any selected channel every two seconds, and switches instantly if it's active.

Programming the Regency Z10 is made easier by a series of plain-language messages that appear on its display. These prompts identify the action that's in process or required next. Individual channels are programmed by using the numeric keypad to enter a desired frequency, or by identifying a desired frequency when searching. A special circuit saves these entries in memory for up to a week (should power fail or if the unit is transported or temporarily stored); it does so without batteries (the usual method of memory protection) to avoid problems associated with battery failure from neglect.

The Z10 can pick up most transmissions in the low VHF (30-50 MHz), VHF two-meter amateur (144-148 MHz), high VHF (148-174 MHz), UHF 3/4-meter amateur (440-450 MHz), standard UHF (450-470 MHz) and extended UHF (470-512 MHz) bands. Its telescoping antenna is electronically optimized for each band, and an antenna jack is provided for an optional external antenna.

A channel lockout excludes selected channels from being scanned, a useful feature when interest is in monitoring some limited number of channels or when a selected channel becomes only occasionally of interest. Scanners in newsrooms, for example, often exclude fire department tactical channels except during major fires.

A scan delay feature helps keep on top both sides of a conversation on channels where calls are usually met by replies. With scan delay selected, the Z10 waits for about two seconds at the end of a transmission (in case there's a reply) before it resumes scanning; without scan delay, scanning resumes in about six-tenths of a second.

When searching, the Z10 delays four sec-

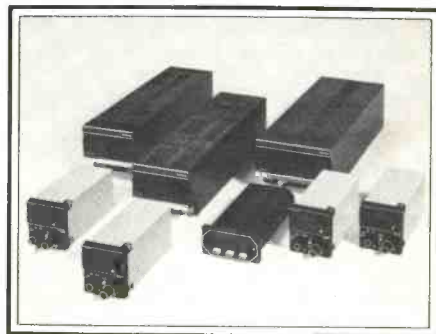
onds after a transmission before resuming its search. This not only allows time to listen for a reply, it also provides enough time to select the frequency for programming into one of the ten scanner channel memories—or simply to note the frequency on paper.

The human factors in the design of the Regency Z10 are quite apparent. Its easily-readable (vacuum fluorescent) display boasts big digits and a choice of two brightness levels. Sliding volume and squelch controls are not only easy to position accurately, they're also easy to read with a glance. Its audio amplifier delivers a full 1 Watt at less than 10% distortion, and a jack for an external speaker is provided. The keyboard and display are each angled for easy legibility.

Dual power supplies are built-in to permit plug-in AC operation at home or DC operation in a car or other vehicle (where not prohibited by law).

The Regency Z10 is UL listed and FCC certified (Part 15, Subpart C). It measures 10-3/4 inches wide by 2-7/8 inches high by 8-3/8 inches deep.

For additional information, contact Regency Electronics, Inc., 7707 Records St., Indianapolis, IN 46226-9986, or circle number 102 on the reader service card.



Two-Way Equipment

An entirely new line of digital radios for business, regional airline, and military aircraft, Collins Pro Line II, has been introduced by the Collins General Aviation Division of Rockwell International.

New Collins Pro Line II products introduced include the VHF-21/22 VHF Comms, VIR-32 Nav, DME-41/42 DMEs, plus CTL-22 Comm Control, CTL-32 Nav Control, IND-42 DME Indicator, CTL-62 ADF Control, and CTL-92 Transponder Control.

This advanced line brings far more information than ever before possible to the cockpit, through extensive use of microprocessors and advanced digital technology. New Pro Line II features include greatly increased frequency storage, display of DME station identifier, three-channel DME, frequency confirmation, and comprehensive cockpit self-test.

The Collins CTL-22 Comm Control offers six-frequency memory storage capability, in addition to the active and preset frequencies. Remote selection of storage frequencies and transfer of preset to active are also available. Innovative design of the CTL-22 allows tuning of 50 kHz channels without going through the 25 kHz channels, with each 25 kHz channel easily available whenever desired.

Like the Pro Line II comm control, the CTL-32 Nav Control provides active and preset frequency display. Four additional pilot-selectable frequencies are also provided in memory.

The CTL-62 ADF Control provides variable rate, two-knob tuning for pilot convenience. This new control also offers four memory-stored frequencies.

Designed for VHF airborne AM voice communications, the Pro Line II VHF-21/22 Comm Transceivers are available with a frequency range of 118.000 to 135.975 (extendible to 136.975 when authorized), or 118.000 to 151.975 MHz. The new VHF-21 will directly replace a Collins VHF-20, while the VHF-22 is recommended for installation where interchangeability is not required.

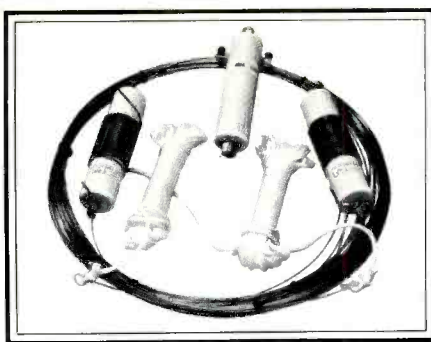
Collins Pro Line II comms operate either with the new CTL-22, or with conventional Pro Line controls. When installed with the new control, 11 wires between radio and control can be eliminated in a typical installation due to serial tuning.

Features of the new comms include frequency confirmation via digital feedback. A message is sent back to the electronic control to assure the pilot that the newly-selected frequency has been accepted by the radio. Advanced speech processing provides superior audio quality for receiving and transmitting. New capture effect squelch and automatic gain control provide excellent reception regardless of altitude or distance.

The Collins VIR-32 Nav Receiver provides all VOR/ILS functions, and can directly replace the current VIR-30A VHF Nav Receiver. A number of mount-strapping options are available to allow aircraft operators to use a single version of the VIR-32 for various applications. Special filtering for rotary wing aircraft is an installation option, for example, that allows installation of the same radio in mixed fleets.

The single-channel Collins DME-41 is a direct digital replacement for the current Pro Line DME-40. The new DME-42 offers exclusive three-channel capability for operator flexibility and navigation information capability. The new DME-42 also provides instant display of distance, ground speed, and time-to-station for any of the three DME stations. High reliability is possible through reduced parts count and new heat-dissipating package designs. Digital design of both new DMEs also offers increased self-diagnostic capability. DME diagnostic information is displayed on the digital DME indicator.

For more information, contact Collins Div., Rockwell International, 400 Collins Rd., N.E., Cedar Rapids, IA 52498.



TEN-TEC Acquires Bassett HF/VHF Antenna Line

TEN-TEC, Inc., the amateur/commercial radio transceiver manufacturer of Sevierville, Tennessee, announced acquisition of the Bassett antenna line. The new TEN-TEC Antenna line includes both multiband fixed station and single band mobile antennas.

The fixed station trapped dipole antennas are offered in 13 models of two, three, four, and five band systems covering 10 through 75 meters. All models use helium filled traps and baluns, stainless steel hardware and "Copperweld" wire. Each model operates as a fundamental broadside dipole, band change is automatic, and no tuner is required to achieve VSWR of 1.5/1 or less. Power ratings are 2 KW PEP.

The single band mobile whip antennas feature helical inductors sealed in helium filled lower sections with stainless steel top whips. Models are available for all bands from 2 through 75 meters. Average weight is 6 oz., yet they remain vertical and resonant at all highway speeds and are impervious to weather. Power ratings are 750 watts PEP.

Accessories include a single-hole 3/8" fiberglass Mobile Deck Mount and a non-inductive 5-band switchable Mobile Matcher to match 3-30 MHz mobile antennas to 50 ohm coax. The Balun, which features a helium field high efficiency air core rated to 5 KW PEP, is also available separately, as are the helium traps for 30 meters.

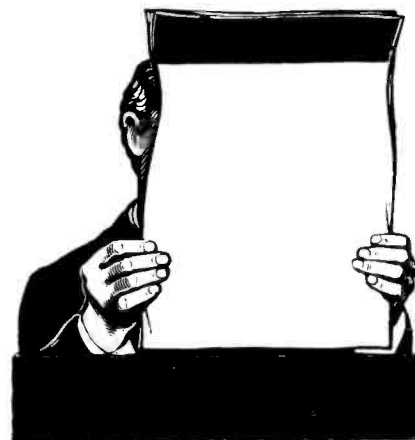
The new acquisition also permits TEN-TEC to supply custom commercial mobile and fixed station antennas.

For complete information, write TEN-TEC, Inc., Sevierville, TN 37862, or circle number 104 on the reader service card. **PC**

POPULAR COMMUNICATIONS

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At present we have copies of all of our back issues available, commencing with the first issue (September '82). These can be ordered by mail at \$1.75 each September '82 through January '84; and \$1.95 February '84 on from Popular Communications. 76 North Broadway, Hicksville, NY 11801. Be sure to specify which issues you want



The Clandestine Confidential Newsletter

A new publication devoted to clandestine stations and programs, *The Clandestine Confidential Newsletter* is designed to keep you up to date on this intriguing aspect of shortwave listening and DXing.

C-C-N will be published six times a year, beginning with the February, 1984 issue. It will contain the latest frequency and schedule information, monitoring data, background information, addresses, and features on new and old stations.

C-C-N will serve as a continuing updater to the new book *Clandestine Confidential*, being published by Universal Electronics.

Subscriptions to C-C-N are \$10.00 per year in North America, \$13.00 overseas, payable in cash, check or money order.

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Gerry L. Dexter,
RR4 Box 110,
Lake Geneva, WI 53147, U.S.A.**

THE EXCITING WORLD OF RADIOTELETYPE MONITORING

A recent book on RTTY crossed my desk—*RTTY Today* by Dave Ingram. *RTTY Today* is a comprehensive introduction to the fascinating hobby of RTTY. It covers the basics of the operating parameters and the concepts of RTTY, RTTY homebrew demodulators that can easily be built, detailed discussion of specific terminals, and finally a compiled guide to RTTY action on short-waves. The pictorials and photographs present on almost all pages adds a nice touch.

This book is highly recommended for the POP'COMM readers interested in and shopping for an RTTY system. In fact, most of the available RTTY gear is discussed, some briefly by a few paragraphs and others detailed over several pages. Microlog

ATR6800, Hal DS 3100 ASR, Hal CT 220, Hal CWR 6850 portable system, Hal ARQ 1000 Amtor terminal, DGM SRT 3000 Send-Receive terminal, Info-Tech M600A, Kantronics mini reader, AEA MBA, Macrotronics terminal, MFJ 1224, and many other RTTY systems are outlined.

Amtor was recently approved (January, 1983) for amateur radio by the FCC and features RTTY character error detection and correction. Amtor is quite similar to the commercial Sitor system used by sea-going vessels to communicate error free (over 90%) with land based point-to-point stations. Using a constant ratio code having a 7-digit character always comprised of three zeros and four ones, errors can easily be de-

tected by continually verifying this ratio.

Standard 170 Hz shifts are used. This means that a standard demodulator can be used but a code conversion must be made to recognize the constant ratio code instead of the "normal" Baudot or ASCII code. *RTTY Today* expands upon these basics. Chapter 8 guides the reader through checked frequencies used for commercial transmission. Keep in mind, however, that checked RTTY frequency lists today become obsolete tomorrow and the initial discouragement is due to the hobbyist attempting to receive RTTY from obsolete RTTY listings. For example, TASS transmission from Havana, Cuba has stopped, but this listing is still present in *RTTY Today*. It is still not known

Frequency (kHz)	Mode	Information
8140	100/425N	Groups of 5 digit numbers sent by Station WBZ-839 (0109)
9889	100/425R	KAWN-SMNT50 W/Wx broadcast. 1st half partly coded and 2nd half totally coded. (2nd half consisted of 3 and 5 digit group.) (2000)
14853	100/850N	WBC-911 W/Uncoded Weather (2004)
16440	100/850N	WBC-971 W/Coded and Uncoded Wx (2013)
14629	67/425R	ANSA (Rome, Italy) W/Nx in Italian? (2017)
14825	67/425N	ADN-39 (Berlin, GDR) W/World Nx in EE (2029)
16185	67/425N	AFP (Moscow, USSR) W/World Nx in EE (2043)
18090	67/425R	KAC RYRYRYRY KAC (Repeated) at 2055 into Coded 5 digit codes w/ some 4 and 6 digit codes built in (2051)
18550	100/425N	NBA - Balboa Naval Radio, Canal Zone W/ DE NBA testing 1234567890 then RY's at 1639
18204	100/425N	APT - APT Repeated 6 times the "05" repeated several times. Repeated over and over at 1627
18763	100/425N	WBC748 W/Groups of 5-digit numbers and several groups of 4-digit letter groups at 1644
19616	100/425N	NBA - Balboa Naval Radio, Canal Zone W/DE NBA testing 1234567890 then RY's at 1653
16136	67/425N	ZCZC - W/(RCC) La Habana Cuba testing to ITT World Com. New York 123456789; then ZCZC and into repeated RY's at 1457

Table 1



This is the HAL Telereader, a very useful device for those who wish to explore a wide variety of RTTY formats.

Frequency (kHz)	Mode	Information
10139.1	50/425N	TNL 96 - Brazzaville Air
	2230Z	12 Mar 84 - RY's
19015.2	50/850R	PWZ33 - Brazil Navy
	2015Z	10 Mar 84 - Calling "RPFN"
14390.5	50/VARR	KAC Woods Hole??
	2120Z	20 Feb 84 - Letter Groups
18189.9	50/170N	Interpol - QTH?
	1205Z	9 Mar 84 - TFC, Police
17490.1	50/425N	YBU - QTH?
	2210Z	22 Feb 84 - RY's & Groups
7438.9	75/425N	QSN4 - QTH?
	0405Z	6 Feb 84 - Test & Groups
14893.8	100/425R	3 x 3
	1740Z	28 Jan 84 - WX

Table 2

when, if ever, this Cuban transmitter will resume TASS operations. The Prensa Latina transmissions continue to be active at the 14901.0 kHz frequency. *RTTY Today* is available at most of the dealers or direct from Universal Electronics for \$1.75 for shipping and handling.

Also from Universal, the introduction of a computer bulletin board devoted to the communications enthusiast will help promote the hobby of RTTY DXing. This board, known as UBIX, is free to the hobbyist and a password will be given to applicants. A free guide will be sent upon request and SASE. Send to: Universal Electronics, Inc., 4555 Groves Road, Suite 3, Columbus, Ohio 43232. Ask also for the free "Listening to Radioteletype" guide.

The beauty of such a bulletin board is to leave messages to other UBIX users (electronic mail), read features of interest, check on sale items, learn about upcoming radio events, and read SWL DX tips left by other users. UBIX presents a fast method of exchanging new RTTY schedule information.

The system is available from 8:30 p.m. to 9:00 a.m. Eastern time. A standard ASCII protocol of 300 baud, 8 bit, no parity, and one stop bit will allow a computer and modem to communicate with the UBIX system. Check with your local computer shop to purchase a suitable computer communications package. My favorite is either ASCII EXPRESS—THE PROFESSIONAL, CROSSTALK XVI, or IBM's DATA COMMUNICATIONS MANAGER. A simple, low-cost terminal and modem will also work. I found the bulletin loaded with good DX tips and it is an ideal forum to exchange your latest loggings. By pooling together hobbyists with specific interests, a club is then formed with members around the country. Many bulletin boards receive calls from England and other European countries. An effective means of locating RTTY broadcasts can be had by agreeing upon a certain time to record S-meter readings and typing in and comparing information on the bulletin board. Well, it looks like this bulletin board is an all-around super communicating medium. Used RTTY equipment can also be found and a want list of used RTTY gear can be added.

Discussing used RTTY demodulators, I spent hours aligning my surplus Frederick 1202 demodulator and discovering how extremely fragile cup core inductors can be! A word to the wise—if older equipment seems to have drifted over time, correct the frequency by adding stable polystyrene capacitors; do not adjust the ferrite core on the cup or pot core inductor. Usually the bandpass and mark/space filters are carefully preset at the factory with an audio sweep alignment generator. Even if you are familiar with alignment techniques, these older inductors can be difficult to set. Thank goodness most of the newer demodulators use active filters and require a simple potentiometer adjustment.

The best policy on new demodulators is to completely leave all filter adjustments alone.

Used demodulators can be found at local

hamfests and can be a bargain if the unit can be set up with a receiver and actually tested over typical operating conditions. Pay attention to its performance with weak and fading signals. If any coils or filters are misadjusted, the mark and space indicator lamps will glow with uneven brightness assuming the proper shift is selected. The frequency shift keyed (FSK) signal is tuned by adjusting the receiver's tuning knob to maximize the brightness of the mark indicator. Selecting various shifts, one shift setting will cause the space indicator to flicker with approximately the same brightness. Make sure this test is done with a known RTTY signal such as the AFP (15908.0 kHz) signal at a reliable 425 Hz shift. This test is useful only with dual matched filter demodulators. Single filter units will only have one indicator and general overall performance is the only clue to a reliable used demodulator. I have had good luck finding the popular but older Hal ST6 demodulators at hamfests.

The ST6 matches the performance of the newest RTTY demodulators minus the "bells and whistles" of the newer integrated Hal demodulator/terminal units.

A new RTTY tuning indicator has been introduced—the Blinky by Time Kit (P.O. Box 22277, Cleveland, Ohio). The Blinky consists of a small housing of 2" x 3" x 5.5" with several LED's mounted behind a filter. The LED's represent particular frequencies, 1.2, 1.5, 1.7, 1.9, and 2.1 kHz. Each fre-

quency has a corresponding temperature stabilized and sharply tuned active filter. The filter's output drives its respective LED's. Your receiver's audio output is paralleled with the Blinky's input. Mark is then tuned while watching the 2100 Hz LED flash corresponding to the shift frequency. A quick reading frequency indicator is the function of Blinky. The frequencies displayed were selected due to the dual RTTY and SSTV (slow scan TV) tuning needs. This will not replace the optimum oscilloscope display but, for the money, works quite well as an RTTY tuning aid.

A compilation of RTTY articles from the *RTTY Journal* 1953-1980, *73 Magazine* 1967-1980, *Ham Radio* 1969-1979, *QST* 1965-1977, and *CQ* 1960-1971 is published by RTTY Journal, P.O. Box RY, Cardiff-by-the-Sea, CA 92007. Also subtitled "Everything you always wanted to know about RTTY but didn't know where to find it," you will find this is a reference list by magazine, date, and RTTY article title. Write to the above address to obtain current pricing.

Armed with this list, specific articles of interest can then be ordered. The *RTTY Journal* is devoted to HAM RTTY and related articles for the RTTY DXer.

Don Saunders from New Jersey has sent in his current loggings, as listed in Table 1, and Ed Flynn's loggings are listed in Table 2. Thanks for your interest. **PC**

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BROADCAST TOPIK

BY MARK J. MANUCY, W3GMG

DX, NEWS AND VIEWS OF AM AND FM BROADCASTING

This column will give readers a view of the current happenings on the AM and FM broadcast bands. Call letter changes, new stations, stations operating for the first time at night, power increases, and other FCC changes are some of the items you will be in tune with through this column. Your input is also welcome. Send us the latest DX you have heard, pictures and other stories of interest to you (send to address at the end of this column).

All around America people who frequent the AM broadcast band have one or several stations to which they attach a certain fondness. A small station I grew up with was WFOY in St. Augustine, Florida. This station came on the air in 1936 with 250 watts on 1210 kHz. Today the station is on 1240 kHz with a kilowatt and a 3 kilowatt FM. The building housing the station is made from oyster shells and the walls are 14 inches thick! It is located adjacent to the Fountain of Youth gardens off Magnolia Drive and the call letters at one time stood for Wonderful Fountain Of Youth! The tower, adjacent to the studios, is in the salt marsh bordering the North River, which is part of the intracoastal waterway. This system has been a pattern for many antenna designers over the years. The salt marsh makes this kilowatt sound like much more—it's been heard in Australia! In the early days of WFOY they employed former navy radiomen as engineers in order to get the news via shortwave by copying the CW transmissions of the news service.

WFOY has been a CBS radio affiliate for most of its 48 years. New owners will be taking over this year as a result of the death of the previous owner, Pat Bernhard. They plan to continue the strong local image the station has maintained over the years.

The face of radio is changing rapidly across America. During the 70's, FM stations passed AM stations in having the majority of the listeners. The trend continued into the 80's and AM stations have been changing formats like crazy in an effort to turn the tide. One of the formats the AMers have swung to has been talk, news, and sports. It seems the vast majority of the 50 kw full-time stations have gone to these formats in some combination. Give the dial a twist at night! The big question remains—will the changes attract the listeners back to the AM band? Some also hope that the new AM Stereo will help return listeners.

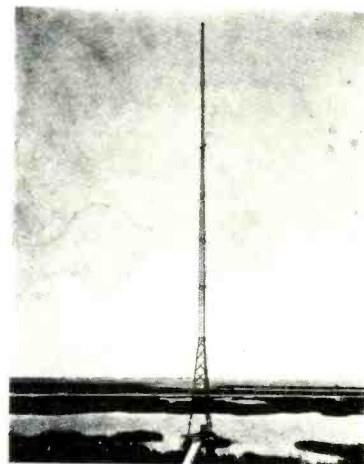
ABC's flagship station in New York City, WABC, was Top 40 for over 20 years and at one point had more listeners than any other station in the nation. The ratings started to fall and today WABC is talk and sports. Many tears were shed when "77 Music Radio" was no more. Probably more stations have been patterned after WABC than any



THIS quaint old 'tabby' house, built of oyster shells and covered with logs and Spanish moss, has the appearance of having been constructed by aboriginal man—yet it houses one of the best equipped Radio Stations in America

ST. AUGUSTINE'S OWN RADIO STATION

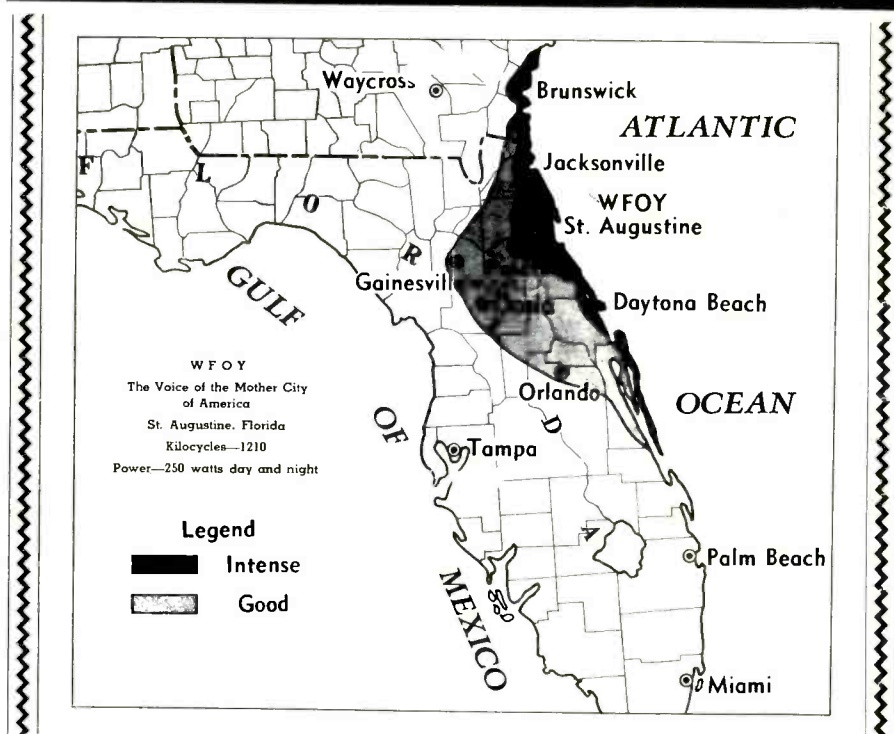
The logs are gone, but otherwise this station is much the same outside. The transmitting equipment is Collins Radio.



ABOVE is pictured an innovation in the selection of a site for the radiator used by Radio Station WFOY. This vertical radiator, some 200 feet in height, is built on a solid rock foundation 9 1/2 feet below the salt-water marsh.

In the background of this picture can be seen the Atlantic Ocean, which affords a salt-water covering for the extensive ground system of some 20,000 feet of copper wiring which extend out 200 feet in straight lines in all directions from the base of the radiator.

The original tower for WFOY is still standing and is now supporting the FM transmitting antenna as well.



Note the legend of intense and good! There was very little interference 40 years ago!

other station in history. Right now, long time rival WNBC is trying to take up the music slack on AM radio and seems to be doing a good job broadcasting in AM Stereo.

How far can a kilowatt be heard? A good example, especially at night, is WGTO in Cypress Gardens, Florida. This station is 50 kw during the day on 540 kHz. They came on the air in 1955 and the call letters stood for Gulf to Ocean (and also Gainesville to Okeechobee). Using only one kilowatt at night, they cover an amazing part of Florida. Next time you're visiting Disney World, listen for them. The format is country music.

Now, switching to FM for a moment—did you know that WRNO in New Orleans will be broadcasting all summer from the World's Fair? If you get a chance, stop by and see them. They are on shortwave as well as FM Stereo. The FCC recently gave WRNO permission to increase their antenna to just over 1000 feet with an ERP of 27.5 kw. We hope to have a story on this "World's Fair Station" in the fall... stay tuned!

As we get into the summer, AMDXing becomes restricted due to static. However, if you are planning a vacation, here is a way to double your pleasure! Plan your route ahead using a *White's Radio Log* or Vane Jones' *North American Radio-TV Station Guide*. Figure out what stations you will be able to hear (log) as you travel. This can bring your totals up despite the static.

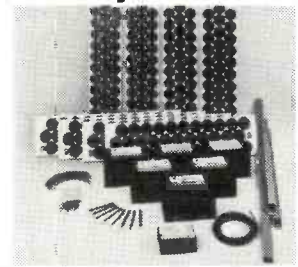
If you're like me and dried up the dial where you live, this is the only time new stations can be logged in any quantity. When

traveling non-stop, the new digital dials make frequency ID very easy, so it is just a matter of getting the station ID. I list the stations I expect to hear ahead of the trip in groups, numerically and by sections of highway. Then when the station is heard, a checkmark is all that is needed. The permanent logging is done when I get back home or during stopovers. Be sure to have a guide with you because no matter how carefully you plan, it will be necessary to refer to a guide when there is a question and especially for nighttime DXing in an unfamiliar area.

By grouping the stations into sections of highway, it makes it easier to remember which goes where. Make each group numerical by frequency so that it will be easy to keep the car on the road! Don't try to remember call letters since they may not be the same as shown in the guide and it is hard enough to keep track of just the frequency. If you miss a station, make a mental note of the frequency and check it every ten minutes or so until you are out of range.

Another way to check for the elusive stations is to set a pushbutton or maybe more to find the stations you're really after. This is where the digital radio really shines. Digital tuning makes DXing much more fun and much less frustrating because the question of frequency is removed from the multitude of variables involved in finding the station in question. I test drove a new digital car radio the other day and was able to hear WABC and WNBC in New York. Baltimore (where I am located) is 180 miles from New York.

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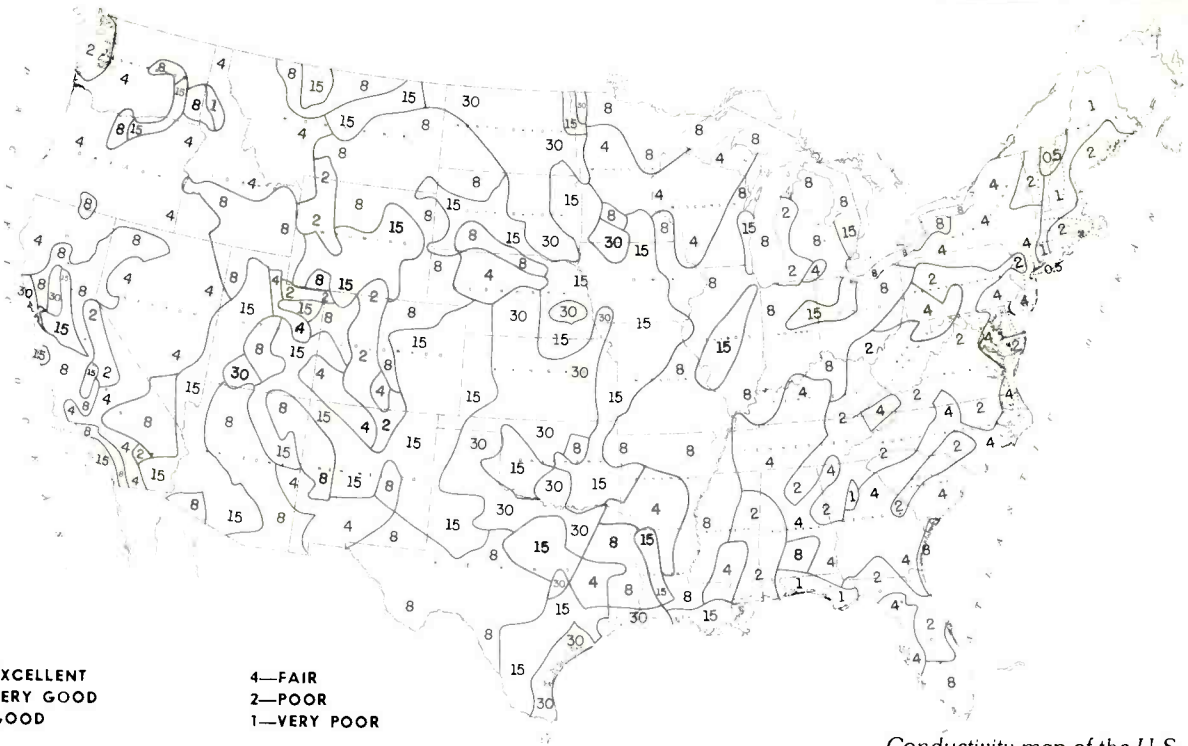
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CIRCLE 56 ON READER SERVICE CARD



Conductivity map of the U.S.

WNBC is 20 kHz from 10 kw WCBM (680) in Baltimore and WABC is 20 kHz from 1 kw WBMD (750), which was about four or five miles from where I was driving. This is how I test drive a new car! The radio passed all of my tests. There was no chatter from the local stations and I was able to easily listen to and identify the New York stations. Now I could consider the other qualities of the car!

Past experience has shown that a top notch radio will receive the 50 kw New York stations in Baltimore. However, there are other areas of the country where 50 kw will travel much more or less depending on the conductivity of the earth. The conductivity is how well a radio signal will travel over the surface of the earth (See our map to check your area). The higher the number the better the conductivity. Sea water is the best at 5,000. The highest over land in the U.S. is about 30, dropping to a 1 in New England, .5 on Long Island. What this chart will tell you is a 250 watt station in the middle of

Kansas or N. Dakota may have a greater range than a 50 kw station in New York City.

So, getting back to our summer DXing via the auto, range will depend on the part of the country you are traveling through and the power of the station. Here's how to compensate: Save the city stations for logging while traveling through their cities. Catch them at traffic lights or other stops. On the highway pick up the ones to the right or left of your location as you travel (on a map). Have the stations listed up to about 40 miles either side of the highways you plan to travel for up to 5 kw AM stations and FM stations other than 3 kw class A. The AM's 5 kw and above and most FM's over 50 kw will be good for over 40 miles. These distances are for the East Coast with a conductivity of eight or less, so double the mileage for areas where the conductivity is more than eight. Over a total salt water path, a 250 watt station may be heard several hundred miles loud and clear.

Catch the 3 kw and less FM's as you pass through their towns or just put them on your "catch as catch can" list. The 10 watt FM's, if you catch them on the air, will have to be within about five miles of your location. These are all very general guidelines.

One other thing to watch for are the roadside AM stations that give travel information. These stations are usually announced via signs on the highway and all normally just above or just below the AM band. Send me info on the TIS (Travelers' Information Stations) that you hear and we'll pass it along to the rest of the readers.

If you can hook a cassette recorder to your radio it might help you with some hard to identify stations if you record them while on the road. Sometimes playing a tape back in a quiet room will make ID easier. Headphones also help, however, I do not recommend headphones while driving, though they might be useful if you are riding "shotgun." That brings up another bit of advice I would like to leave with you; unless you are traveling alone, please be considerate of your passengers. They may not enjoy DX-ing as you do!

Well, now the rest is up to you and I expect to hear about this terrific vacation via the mail. I'll tell you about some of mine as I am traveling into an area with 15+ conductivity for the first time in my life!

This is a new column in POP'COMM and we want reader input. Send me your DX and other news and views. Please send along sharp-contrast photocopies of your better QSLs. Any questions you want answered should include an SASE. Please use the mails for correspondence and do not telephone since my answering service is on strike! The address is: Mark Manucy, P.O. Box 5624, Baltimore, MD 21210-0624.

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CIRCLE 39 ON READER SERVICE CARD

Station Updates

Call Letter Changes

WKKO	Cocoa, FL	to WJZX
KTCR	Minneapolis, MN	to KTVN
KBBL	Lubbock, TX	to KFMX
WUNI	Mobile, AL	to WMML
WAYE	Baltimore, MD	to WBGR
WTCX	Bay City, MI	to WXOX
WTWN	Grand Rapids, MI	to WLAV
KSD	St. Louis, MO	to KUSA
WFEC	Harrisburg, PA	to WHGB
WSNI	Philadelphia, PA	to WPGR
WSNI-FM	Philadelphia, PA	to WSNI
WBOL	Bolivar, TN	to WJDS
WYNT	Colonial Hgts., VA	to WPVA
WPBH	Middlefield, CT	to WPKT
WOOK	Washington, DC	to WDJY
KWBJ	Payette, ID	to KQPD
KRSL	Russell, KS	to KCAY
WZZR	Grand Rapids, MI	to WLHT
KFMT	Pendleton, OR	to KWHT
KSUL	Keene, TX	to KJCR
WVRS	Waterbury, VT	to WTIJ
WLVE	Baraboo, WI	to WNLT
KWYT	Salinas, CA	to KTOM-FM

New Stations

Imperial, NC	1560	5 kW D-1 kW CH
W. Fargo, ND	660	10 kW D-1 kW N
Priceville, AL	960	2.5 kW D WGRR
	1310	1 kW D
Olyphant, PA	750	2.5 kW D
Redding, FL	91.9	4.8 kW-1434 ft
Las Vegas, NV	90.5	100 kW-1269 ft
Cave Junction, OR	102.7	100 kW-1976 ft
Casper, WY	103.7	58 kW-1929 ft

Power Changes

KVMA	Magnolia, AR	to 100 kW (102.9)
KCNB	Waterloo, IA	antenna to 1301 ft. (105.7)
WMYK	Elizabeth City, NJ	to 100 kW antenna to 1420 ft (93.7)
WJHU	Baltimore, MD	to 25 kW antenna to 200 ft (88.1)
WJST	Pt. St. Joe, FL	moves from 93.5 to 94.5 increase to 100 kW at 520 ft
KLAT	Houston, TX	increases night to 5 kW (1010)
WVCH	Charlottesville, VA	night to 2.5 kW (1260)
WAYE	Baltimore, MD	day to 5 kW (860) (WBGR)
WANN	Annapolis, MD	day to 50 kW (1190)
WRNO	see text	

Abbreviations: will be used every month

w	= watt
D	= day
N	= night
ft	= feet (antenna height)
kw	= kilowatt
kHz	= kiloHertz
DA	= directional antenna
DA-D	= directional antenna daytime only
DA-1	= directional antenna same pattern day and night
DA-N	= directional antenna nighttime only
DA-2	= directional antenna different pattern day and night and/or power
CH	= power used during critical hours which are until two hours after sunrise and starting two hours before sunset
ERP	= Effective Radiated Power is used with FM stations to show the power radiating from their antenna

Example of vacation "trip tik"

This sample will show a portion of my trip through Alabama. While over-nighting near Huntsville, I will try for nearby cities of Decatur, Athens, Hartsville, Moulton plus nearby Tennessee. I will be using a small loop with an ICOM R-70 and will also try to pull in stations in Florence, Sheffield, Muscle Shoals, Tusculumbia, Russellville, and others. After leaving Huntsville and proceeding south on I-65 toward Birmingham and then onto I-59, my chart will look something like this:

I-65 Huntsville to Birmingham

city	ck	frequency	kw-pwr/ft	call
Cullman		1340	1	WKUL
		1460	5	WFMH
		92.1	3	WKLN
Gadsden		101.1	87/330'	WFMH
		570	5	WAAX
		930	5	WJBY
		1350	5	WGAD
Oneonta		89.9	3.5	WEXP
		103.7	97/1000'	WQEN
		1570	2.5	WCRL
Jasper		97.7	1/480'	WKLD
		1240	1	WARF
Birmingham		1360	1	WWWB
		102.5	39/140'	WWWB
	610	5	WSGN	
	690	50	WVOK	

To add to the interest of the trip, I will set my push buttons on leaving Huntsville for the frequencies of 690, 850, 1000, 1070, and 1550 to see the difference of the high power stations coverage in northern Alabama.

PC

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Shown mounted directly to receiver with supplied adapter.

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SATELLITE VIEW

BY JEFFREY KEATING, WB4KDH

INSIDE THE WORLD OF TVRO EARTH STATIONS

The SPACE and STTI satellite trade shows held recently in Las Vegas, Nevada demonstrated that the home TVRO explosion is hotter than ever before. Nearly 300 booths of earth station gear were present at each event, with prices on LNAs and motorized actuators at their lowest ever. Don Berg, Marketing President of Channel Master, predicted that sales of TVRO equipment will exceed more than \$1.2 billion dollars in 1984. With more than 200,000 home earth stations systems already sold in 1983, it is expected that an additional 400,000 systems will be sold in 1984. By the end of 1984, there will be 700,000 home earth stations in operation throughout North America. Experts are now saying that a total of 10 to 15 million earth stations will be in the field by 1990.

One of the most significant developments noted at the recent conventions was the entry—in a big way—of the Japanese into the home earth station marketplace. Many readers will remember the CB radio boom in the 1970's. Once the Japanese, Koreans, and Taiwanese became active in manufacturing units, the American marketplace was literally flooded with inexpensive CB radios. Suddenly everyone was buying them. With the entry of the Far Eastern manufacturers into the TVRO marketplace, we may find that history once again is repeating itself.

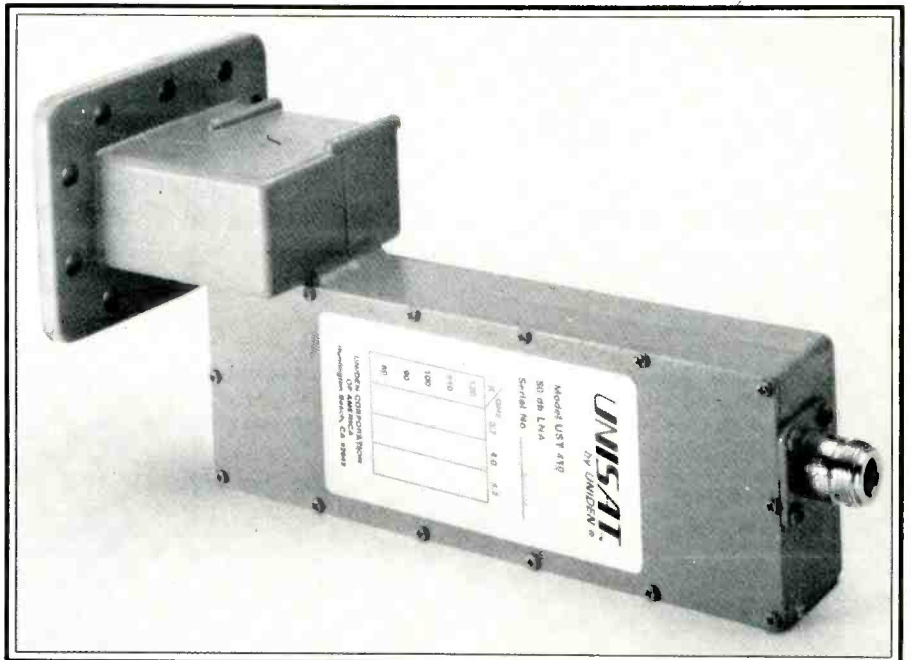
The largest manufacturer of two-way radio equipment in the world has embarked on a satellite manufacturing endeavor that will have far ranging implications for the home earth station industry. The Uniden Corporation has announced its entry into the field of satellite television and communications and has appointed Guy Davis (formerly of Intersat) to head the company's new Satellite Technology Group for the United States and Canada.

When he announced Uniden's entry into the TVRO marketplace, Chairman of the Board William Rozell emphasized that the Uniden Corporation of America, through its affiliation with Uniden Corporation of Japan, is bringing over two decades of consumer electronics manufacturing and marketing expertise to the satellite television industry. Uniden, one of the major forces in telephone, land mobile, marine, and personal communications hardware, released its new line of earth station receivers and antennas at the Las Vegas shows.

"Satellite television reception is coming out of its infancy, poised for explosive growth," said Mr. Rozell concerning his company's entry into a new and challenging field. "Uniden's proven management experience, product development and manufacturing capability, marketing and advertis-



The Uniden UST 1000 Satellite Receiver has many useful features that aid its ease of operation.



Here is the UST 410 Low Noise Amplifier from Uniden, which combines advanced technology and weather-sealed rugged construction for solid, reliable performance.

ing background, and reputation for quality and reliability are unchallenged in this field, positioning Uniden to become the premiere provider of satellite television broadcasting and communications technology."

Uniden already has its share of some of the world's most distinguished microwave engineers at its disposal. The Uniden Satellite Technology group is headed by Dr. Yoshihiro Konishi, an internationally respected engineer and pioneer in 4 GHz (C-Band)

and 12 GHz (Ku-Band) television broadcasting, holds more than 175 different patents on electronic design. Dr. Konishi was involved in the development of Japan's DBS satellite system, which currently consists of a single Ku-band satellite with two transponders for the transmission of entertainment programs throughout the Japanese islands. Dr. Konishi joined Uniden after a remarkable career at NHK-TV, the Japanese Television Broadcasting Corpora-

tion. At Uniden he oversees one of the largest engineering staffs available in the satellite industry.

Joining Dr. Konishi in Japan is John W. Lane, serving as senior advisor. Mr. Lane is the former chief executive officer of Midland International, the Kansas City based importer of Far Eastern electronics that cornered a substantial share of the CB radio marketplace back in the 1970's.

Under the brand name Unisat, Uniden is now marketing a complete line of C-Band (4 GHz) TVRO (television receive only) equipment, consisting of the UST-1000 or upgraded UST-3000 receiver, a low-noise amplifier (LNA), an antenna and a feed horn (polarizer), and in August will introduce another upgraded C-Band (4 GHz) receiver, the UST-5000.

"But more than offering quality products," stated Mr. Davis, "we at Uniden Satellite Technology Group intend to bring to this industry the sophistication to which it has not been previously accustomed. We will be marketing a breadth of satellite receiving systems with the highest engineered reliability, and backed by a large brand name that consumers can rely on, as well as complete schematics, manuals, and service centers. We plan to educate the consumer to look beyond just price and recognize the long-term quality and value of our satellite products and services."

Uniden, aware of the developing market in the U.S. and Canada for 12 GHz earth stations capable of receiving Ku-band DBS services, will start in October of this year to offer a complete package for the higher frequencies as well. Uniden will be competing with Alcoa/NEC (Nippon Electric Company) and General Instruments for a share of the DBS terminal marketplace.

Another surprise entry into the earth station receiver market was the Electra Company—manufacturers of the Bearcat line of VHF and UHF scanners. The new Bearcat GSR 2001 satellite receiver features block downconversion, allowing the easy installation of more than two independently-tuning receivers at a single location.

With manufacturers like Uniden and Electra entering the TVRO marketplace, we expect that a higher standard of performance along with increased professionalism in service to be the new standards for the industry. This can only be good news to the TVRO owner of the mid-1980's.

The twin March Las Vegas shows previewed a new lower pricing structure for low noise amplifiers. Some LNA manufacturers are finally being able to turn out very low noise temperature units in quantity and at prices never seen before. Several new companies manufacturing low cost motorized dish actuator systems were also present at the show. With the dramatic price drops seen here, along with further reductions in receiver prices with the entry of increased competition from Japan, we expect that, by 1985, the cost of a typical home earth station will drop to around the price now paid for a full-featured video cassette recorder **PC**

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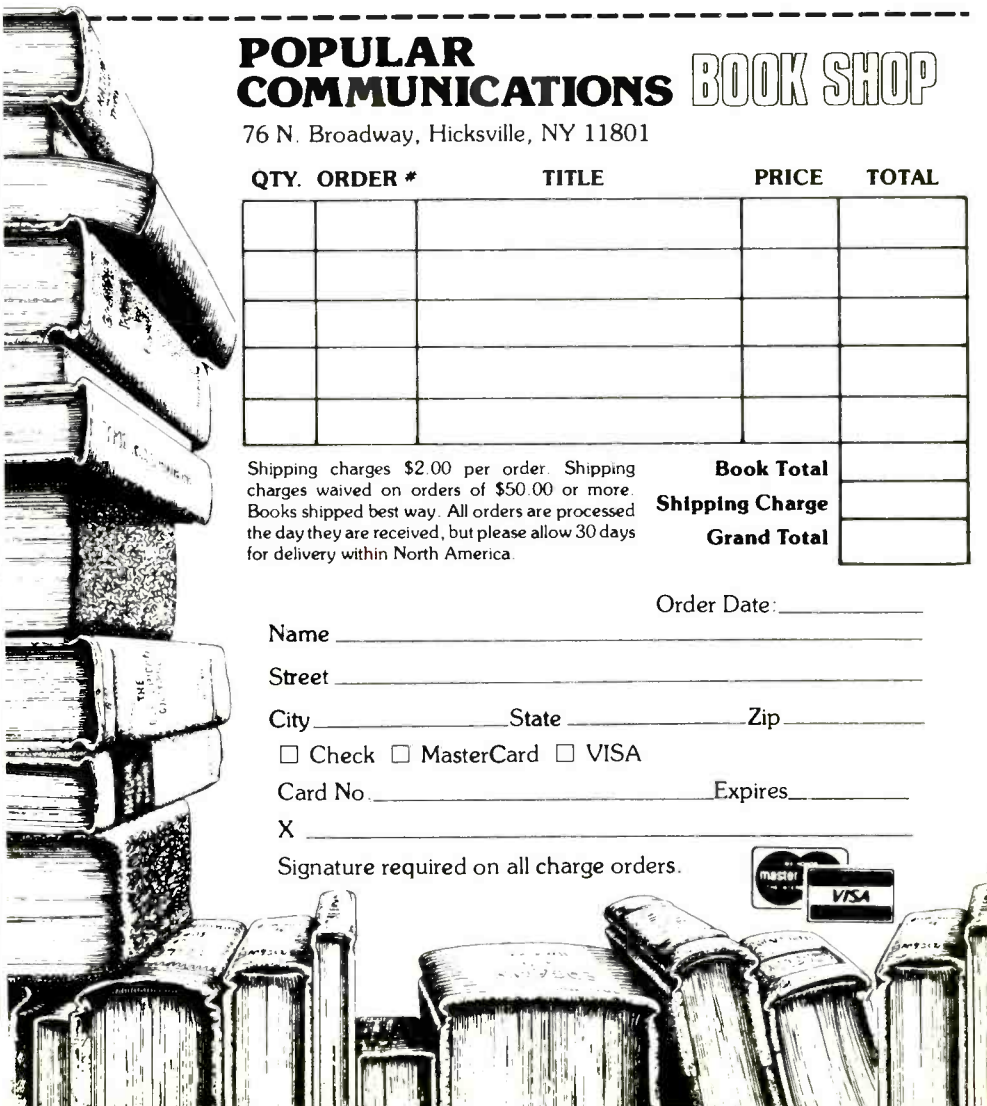
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SCANNER SCENE

BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 900 MHz "ACTION" BANDS

If you will be in the Los Angeles, Dallas, or San Francisco areas this summer, you're in for a scanner listening bonanza.

The activity to generate perhaps the most communications this summer will be the Summer Olympic Games to be staged all around Southern California. Because the Games are not being held in one particular area around Los Angeles, special telephone, information, and radio networks have been installed to handle the expected overload.

Motorola Inc., one of the sponsors of the Games, has enlisted 3,000 pagers, 2,000 walkie-talkies, and 400 to 500 mobile radios to help coordinate the various activities over the five counties the Games will be held. A cellular telephone system also is in the process of being set up in the Los Angeles basin and will increase the region's capacity for mobile telephones from about 4,000 to more than 50,000. Motorola will make 200 cellular mobile telephones available for coordination and will set up a system of 50 to 60 cells to handle the volume of calls to be placed.

The volume of radio communications is expected to be so great for the Olympics that the Federal Communications Commission has set aside two unused bands of frequencies for the exclusive use of the Los Angeles Olympic Organizing Committee and ABC-TV, which will carry live coverage of the Games. The two bands to be used are 482-488 MHz and 500-506 MHz. Presumably 482-485 and 500-503 MHz will be used for repeater outputs and 485-488 and 503-506 will be used for repeater inputs. For the record, frequencies in the 470-494 MHz band were used during the 1980 Winter Olympics in Lake Placid, NY.

The Los Angeles Olympic Organizing Committee also has set up a regionwide paging system on 929.7875 MHz and the U.S. Olympic Committee has been authorized to use 457.525 and 457.600 MHz for portable communications in organizing the Games. But there will be plenty of other channels in use by various agencies during the Games. Don't forget to tune in on public safety agencies such as the Los Angeles County Sheriff's Office on 39 MHz and other units such as ambulances. Even the FBI expects to have an extensive network of agents at the Games to prevent any possible terrorist activities. Although some of the FBI's communications may be on the routine 163 and 167 MHz channels, expect a majority of their traffic to be scrambled using Digital Voice Protection (DVP) on special channels dedicated just to the Olympic detail. A safe guess would be that those DVP communications would be on 170 MHz channels. If you hear any activity, or even



Hand-held scanners such as the Bearcat 100 are the best way to monitor political conventions if you can get close enough.

procure a rare QSL card from the Olympics, let us know here at Scanner Scene.

The two other big communications-related events to be held this summer are the Democratic National Convention in San Francisco and the Republican National Convention in Dallas. Whenever you bring together big-name political figures, media types, dignitaries and government agents, you're bound to hear lots on a scanner.

The news media that will be covering the two conventions have allocated frequencies among themselves so that one network doesn't wind up operating on the same frequency as a local TV station. Most news media activity will occur on 161.64-161.76 MHz and the 450-451 and 455-456 MHz bands. You'll also find some activity on the 173 MHz relay press frequencies of 173.225, 173.275, 173.325, and 173.375 MHz. In fact, the Democratic National Com-



If you plan to monitor the Olympic Games, a scanner that can operate on AC from home or motel room or DC from the car, such as the Bearcat 210XL, is the best bet.

mittee was heard using one of the 173 MHz channels during their last convention in New York City in 1980.

It also would be wise to keep an ear on low-power and itinerant business band channels such as 151.625, 154.570, and 154.600 MHz. Almost anybody could pop up on those channels, including 464.500, 464.550, 469.500, and 469.550 MHz. You also might want to tune in the mobile telephone and radio common carrier channels in the 152 and 454 MHz bands. You never know who you may hear placing a telephone call.

Various public safety agencies also will be helping out with coverage at the conventions. In fact, a total of 23 separate security task forces will be employed for the Democrats' convention in San Francisco. You'll hear activity on police channels, as well as business band channels possibly employed by various security companies called upon to help maintain order.

Mailbag

Ron Meisheid of Orlando, Florida, writes in to say he enjoys Scanner Scene and uses a Bearcat 300 with a Hamtronics 800 MHz converter and a Radio Shack tri-band antenna. Ron sends along some frequencies, including details on the new Orange County, Florida, Fire Department's 800 MHz system.

Orange County Fire Department

- 859.4375 Tact 1—Central dispatch, all zones
- 860.4375 Tact 2—Fire marshal and department personnel
- 858.4375 Tact 3—East side and working engine channel
- 857.4375 Tact 4—South and west side working channel
- 856.4375 Tact 5—Northwest working engine channel

Orange County Sheriff's Department
 460.025 Ch. 1—Northwest
 460.125 Ch. 2—West side
 460.275 Ch. 3—East side
 460.475 Ch. 4—South side
 460.300 Ch. 5—Detectives and special events
 460.175 Ch. 6—Teleprinter countywide
 460.350 Ch. 7—Car to car

City Of Orlando Police
 460.050 Ch. 1—Teleprinter citywide
 460.100 Ch. 2—Northeast
 460.400 Ch. 3—Southeast
 460.450 Ch. 4—Citywide/special events
 460.425 Ch. 5—Citywide/surveillance and special events
 460.075 Ch. 6—Reserved, not in use

City Of Orlando Fire Department
 453.050 Ch. 1—Central dispatch
 453.150 Ch. 2—Working engines
 453.250 Ch. 3—Executive personnel
 453.350 Ch. 4—Cross band with county fire/major fires

Orlando International Airport
 120.150 Air controller—35 miles out
 125.550 Final approach—15 miles out
 124.300 Tower
 121.800 Ground control
 121.250 Recorded pilots information
 453.300 Airport police
 453.100 Maintenance
 453.850 Airport operations
 460.600 Airport Fire Department
 453.525 Emergency

Orlando Executive Airport
 121.100 Flight landing—northeast
 119.400 Flight landing—southwest
 118.600 Tower
 121.700 Ground control

Miscellaneous
 154.665
 154.680
 154.695
 154.920 Florida Highway Patrol
 155.370 Intrastate police frequency (state, city, county)
 154.430 Intrastate fire frequency (state, city, county)

C. M. Reed of Coraopolis, Pennsylvania, reports he has been monitoring the National Oceanic and Atmospheric Administration on 163.275 MHz. He reports hearing two stations passing meteorological data such as wind speed, visibility, and barometric pressure. Apparently the information is being passed on to the National Weather Service forecast office at Greater Pittsburgh Airport. Transmissions are made generally ten minutes before the hour every hour, but can occur at any time.

What about you? What are you listening to on your receiving gear? Do you need help trying to identify a certain station? Maybe our readers can help. Why not send along a picture of your communications setup as well. We'd like to hear from you here at POP'COMM. Write to: Chuck Gysi, N2DUP, Scanner Scene, Popular Communications, 76 N. Broadway, Hicksville, NY 11801.

PC

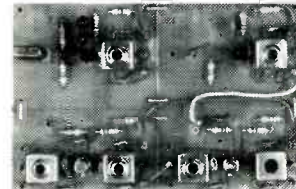
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PIRATES DEN

BY DARREN LENO, WD0EWJ

FOCUS ON FREE RADIO BROADCASTING

According to Sweden Calling DXers, British officials are searching for the location of Britain's first unlicensed pirate TV station. The station, calling itself Telstar, usually makes one transmission a week in a Birmingham suburb. After BBC 2 signs off for the evening, Telstar occupies the vacant channel and airs pop music videos of groups like Duran Duran, and movies such as *Kramer vs. Kramer* and the *Exorcist II*. So far, the station has shown moral restraint, showing no pornographic or excessively violent films. And while British Telecom engineers work to locate the source of the illegal transmissions, Telstar's audience, estimated somewhere near 5,000 viewers, will continue to enjoy this alternative in programming.

Across The Dial

KFAT was heard by Kirk Allen of Oklahoma broadcasting on 7433 kHz after 0250 GMT. This station programs country music for its audience. Listeners can receive a QSL by sending a detailed reception report to PO Box 5074, Hilo, HI 96720.

KQRP was heard by Grant Lochmiller of Iowa on 9935 kHz after 2000 GMT, on 15050 kHz after 2000 GMT by John Santosuoso of Florida, and on 7395 kHz after 0700 GMT by Fred Roberts in Ohio. This station sure gets around. KQRP broadcasts rock and roll music over their 30 watt transmitters.

KQSB, an innovative pirate that is always trying something different, recently broadcast on two frequencies in parallel—11600 and 15050 kHz after 1900 GMT. John Santosuoso tuned this transmission and noted the Hilo, Hawaii address mentioned for reception reports.

New Wave Radio Int'l. is still active in the 40-meter band on or near 7395 kHz, usually after 0600 GMT. This station continues to tell listeners to send reports to the Association of Clandestine radio Enthusiasts, but A*C*E is still not sure what to do with them. Until further notice, you may not have much luck getting a QSL through this address. A*C*E has been printing the names and addresses of people who have sent reception reports in their bulletin, hoping that NWRI will verify reports this way.

A relatively new pirate, Radio Ganymede, was heard on 6900 kHz by Kirk Allen after 0000 GMT. The station gave a loop number for phone calls, but suddenly signed off shortly thereafter.

Ohio DXer George Zeller heard Radio USA on 7410 kHz past 2100 GMT after hearing a report of them given by another pirate. Samurai Radio on 6225 kHz.

The Crystal Ship is back after a brief absence from the airwaves. Paul Walkendorf

heard "The Poet" and "The Radical," TCS's two interesting personalities, during a transmission on 7420 kHz after 0230 GMT. Mike Goetsch also heard this station, but on 14797 kHz after 1930 GMT.

The Voice of Laryngitis seems to have found a home on 15050 kHz. John Santosuoso heard them here after 1930 GMT. However, the VOL is also right at home on 7430 kHz where several DXers, including Dan Miller of Wisconsin, heard them after 0000 GMT. Those who have heard the Voice of Laryngitis often describe the programming as very well produced and exceptionally humorous. Unlike some pirates that try to be funny, this one actually succeeds.

I had the opportunity to hear Radio Free Insanity near 7430 kHz recently after 0200 GMT. The station was playing almost exclusively Beatles music and was on the air for quite some time. The thing that impressed me most about this station was the strength of its signal. Other listeners from around the country also report very strong reception of this pirate.

KPRC Jammed

For several weeks now, KPRC has been intentionally jammed on its 1616 kHz frequency by a station using lower sideband. DXer Scott McClellan reports that the jamming station's announcer uses a fake oriental accent and makes sarcastic and rude remarks concerning KPRC. Also, he frequently belches! A caller to KPRC was put on the air and asked the jammer how much power he was using, to which came the reply, "40,000 watts." Scott says that the jammer was strong, but not *that* strong.

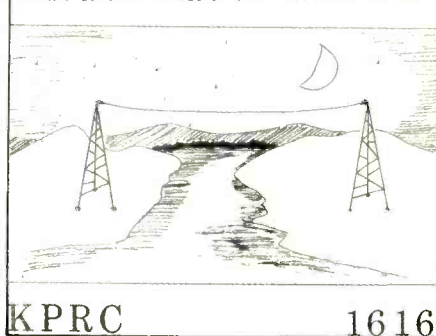
Letters From Pirates

I was recently contacted by a pirate calling itself Tangerine Radio. Although still in the planning stages, by the time you read this the station may be on the air. Frequencies to keep a lazy ear to include 7474 kHz, and 25992 kHz on weekends.

Also received through the mail was a letter from the Scorpion, a personality on WCFR-Chicago Free Radio. WCFR goes back several years, but hasn't been heard in quite a while. But all of this is to change soon. The Scorpion says WCFR has made several successful test transmissions, and that listeners should keep an eye on 7300 kHz, 14400 kHz, and 21600 kHz, between 0000-0600 GMT on weekends.

WCFR will program mainly "oldies but goodies," or songs from the 1950-1960's era. Broadcast tapes from listeners and readers will be considered for airplay, and should be sent with an SASE to WCFR, 2226 S. Gunderson, Berwyn, IL 60402. Cassette or reel-to-reel recordings will be accepted.

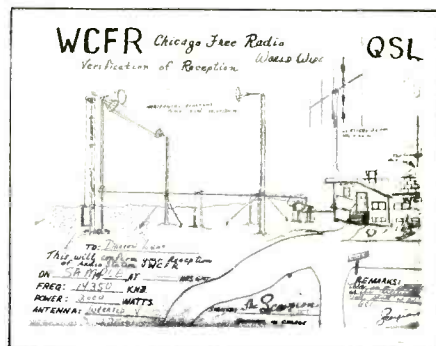
Pirate Radio Central



KPRC

1616

Reader Howard Kemp in New Hampshire sends this QSL card he received from KPRC, a pirate that operates on AM, FM, and SW.



WCFR - Chicago Free Radio hopes to be on the air soon on 7300 kHz and 14400 kHz.



Tangerine Radio is another pirate hoping to be on the air shortly. Watch 7474 kHz and 25992 kHz for some action.

Where To Hear Them

It has been several months since the last time I reviewed the basic "pirate DXing" strategies in this column. Lets go over them again for those who may be new to this aspect of the hobby.

Most pirates operate somewhere between 7350 and 7440 kHz. Other frequency ranges to keep close watch include 6900-7000 kHz, 6200-6300 kHz, 3200-3500 kHz, 1600-1620 kHz, and lately, 14700-15100 kHz. These ranges have been especially active in the past and probably will

continue to be for quite some time. Notice that many of these frequencies are just above or below the amateur radio bands. This is because most pirates use slightly modified ham radio equipment.

Most pirates are NOT ham operators, and they are very careful to avoid frequencies allocated to the Amateur Radio Service.

You will find that most pirates operate during Friday and Saturday evenings, between 0200 and 0600 GMT, although not exclusively. Take note of frequencies and times listed in The Pirates Den and use them to keep on top of where and when the action is happening. It will take time and some effort before you hear a pirate, but persistence always pays. Every weekend, pirate stations are on the air just waiting to be heard by you. It's just a matter of being at the right frequency at the right time.

A useful tool for the pirate DXer is *The ACE*, a monthly bulletin dedicated to pirate, clandestine, and spy-numbers activity in the United States and abroad, published by the Association of Clandestine radio Enthusiasts. For more information, send a large SASE or \$1.00 for information and a sample issue of *The ACE* to: A*C*E, PO Box 452, Moorhead, MN 56560. It is certainly worth your time to check out this club, which is a member of ANARC. Please mention you heard about A*C*E in this issue of *POP'COMM*.

Mail Drops

Almost every DXer who searches for pirate stations, upon hearing one, would like to receive a QSL card for their efforts. This is done by sending a detailed reception report to the address a station gives over the air, almost always a post office box.

Mail drops are usually run by a person who has access to the pirate using the address. He or she is able to provide a free service to SWLs and DXers by forwarding their mail to the pirate, making it possible for the listener to receive a QSL card or any other collectibles the station may send to listeners.

But doesn't the FCC say that it's illegal to aid a pirate broadcaster in any way? The answer to that question could only be yes, it is illegal to aid pirates. However, all mail drop operators I have talked to feel that they are not aiding pirates, but rather the SWL community. After all, if a pirate wants to know if his signal is getting out, a simple logging check of any one of the many fine SWL club bulletins will provide that kind of information. It is not essential to the operation of a pirate radio station to receive letters from listeners, but many of us sure enjoy getting those pirate QSLs.

I'm sure there are many who would disagree with me and say that mail drops are indeed a way out of aiding an illegal broadcaster. The question, however, has never been tested in court. One would think a way to get at pirates would be through their mail drops, but the FCC apparently has some reservations about prosecuting people who forward letters for SWLs.

This is not the case in England. The well-

known 32 Victoria Road, Salisbury, Wilts, address was visited by authorities late last year inquiring about Radio Avalanche, one of the address users. The visit was enough to intimidate the owner of the address, and enough to frighten the other address users so that it was agreed shortly afterward to close 32 Victoria Road to pirate mail. While several of these pirates are looking for a new "accommodation address," the British government will seriously consider legislation which would make it blatantly illegal for anyone to forward mail to unlicensed broadcasters. If or when this law comes into effect, it is likely that many of these British "Free Radio" pirates will seek an accommodation address in another European country. A law banning accommodation addresses in England would be of little consequence to the pirate, but simply a minor nuisance.

Here in the United States, there has never been any FCC harassment or action taken against the people who send your mail to pirates. This is not to say that such action could not be implemented in the future, but it seems rather unlikely. For the time being at least, it appears that your pirate reception reports will arrive at their destinations, and that your QSLs will be forthcoming.

In Conclusion...

The AM Press/Exchange is a publication dedicated completely and passionately to the AM mode of communication. If you are a ham or just have a basic interest in AM, send a large SASE for information to: The AM Press/Exchange, Dept. PC, Rt. 1, Box 281, Woodlawn, TN 37191.

H*A*R*K is a club dedicated to the enhancement of legal FCC Part 15 broadcasting. For more information, write H*A*R*K, attn: Mr. Arnold Timm, Dept. PC, 2308 Garfield #304, Minneapolis, MN 55405.

If you haven't heard by now, Gerry Dexter's Clandestine Confidential newsletter is a very good bi-monthly source of information on worldwide clandestine broadcasting activity. For information, send a large SASE to Gerry Dexter, RR 4, Box 110, Lake Geneva, WI 53147.

Thanks for tuning in this month. If you have any information you would like to contribute to this column, including loggings, insight, Xerox copies of QSL cards or pennants, etc., please write me at The Pirates Den, c/o Popular Communications magazine, 76 N. Broadway, Hicksville, NY 11801. Good Dxing!

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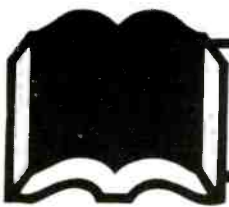
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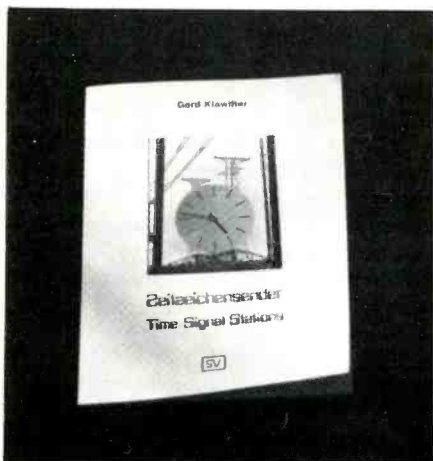
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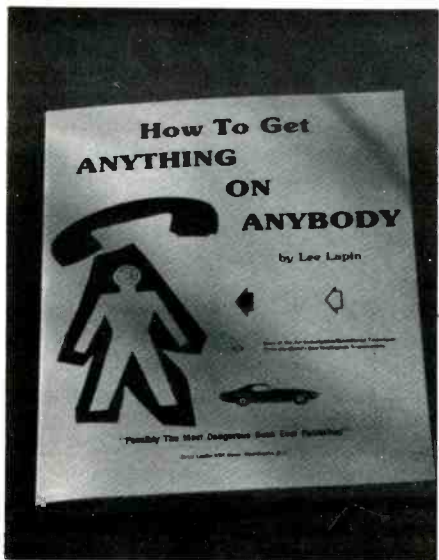
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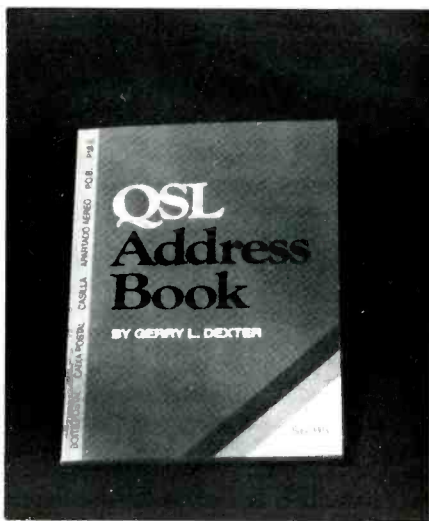


The 10th Edition of Gerd Klawitter's book *Time Signal Stations* has recently been issued (in the past this book was published under the name of *List of Time Signal Stations*). This is a bilingual (English and German) publication containing 82 pages and listing a great wealth of information on Standard Frequency and Time Radio Stations throughout the world—callsigns, frequencies, schedules, transmission characteristics, QSLing policies, etc. This covers all such stations known to be operating between 20 kHz and 170 MHz. The book costs \$4 from Wolfgang Scheunemann Verlag, Verlagsbuchhandlung, Bonner Strasse 328, 5000 Köln 51, West Germany.



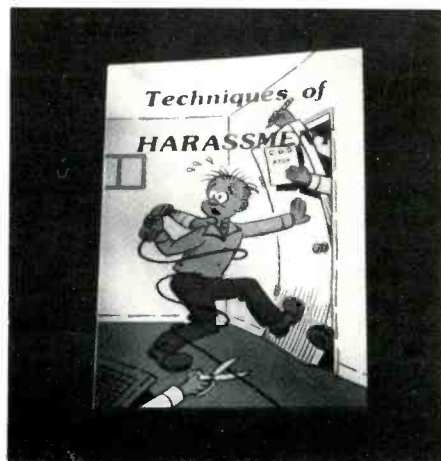
How To Get Anything On Anybody, by Lee Lapin, is a 268-page book which, in its 42 chapters, covers surveillance, intelligence gathering, surreptitious monitoring, and all sorts of other interesting pastimes. If you'd like to know about lie detectors, psychological stress evaluators, telephone

and room bugs, long distance microphones, night viewers, how to de-bug a room or un-tap a telephone line, this book will clue you in. Lapin also provides a lengthy listing of suppliers of the hardware used by professional and amateur snoopers. Best of all, the book is enjoyable and totally absorbing to read; you just can't bring yourself to put it down once you pick it up. The book is \$30 plus \$4 postage. You can order a copy from Auburn-Wolfe Co., (Dept. 100), Box 623, Holmes, PA 19043.

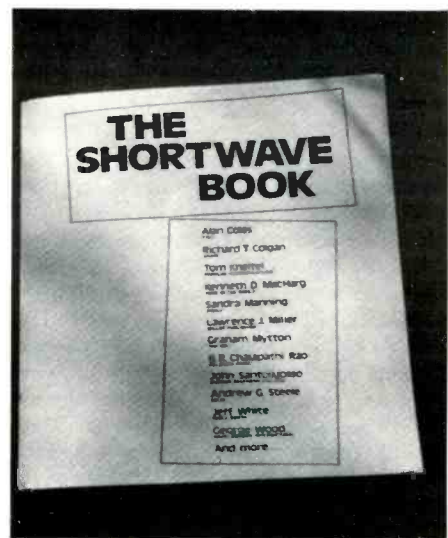


The QSL Address Book, by Gerry L. Dexter, is a new 104-page book which (in its 4th Edition) continues the tradition of providing a goldmine of information for those who are into seeking QSL cards. Not only does Dexter offer the latest mailing addresses, but he also "grades" each station for its willingness and reliability to provide QSLs! Text material at the beginning of the book tells how to write a report for maximum QSL return and offers many useful hints from this well-known veteran DX chaser (Dexter has verified 225 countries which is one of the top scores in the world). This book is \$6.95 from Gilfer Associates Inc., P.O. Box 239, Park Ridge, NJ 07656.

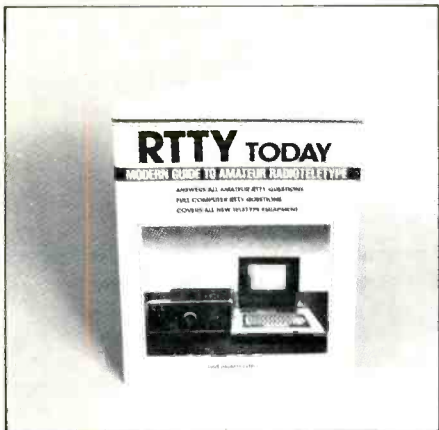
Techniques For Harassment (How The Underdog Gets Justice), by Victor Santoro is one of the most unusual books to come along in quite a while. In today's society there exists a large "gray area" of justice where the average good guy gets it from all sides and seemingly has no way of getting satisfaction—no, getting justice—no, retribution—no, getting *revenge!* Many wrongs done to the average person fall short of being criminal, so no help in setting the record straight can be expected from the police. Others are of such a nature that it simply isn't practical or economically feasible to seek legal retribution. In this book, Santoro out-



lines a virtual encyclopedia of simple, improvised "dirty tricks" the underdog might use to display his unhappiness at getting done-in, thereby reducing his target (tormentor) to a quivering mass of jelly. No legal or moral assessments are made, and the book cautions the reader that it is offered for "entertainment purposes only." It's \$7.95 plus \$1 postage, from CRB Research, P.O. Box 56, Commack, NY 11725.



The Shortwave Book is a really useful collection of monitoring articles from different authors. Topics include buying a receiver, features on specific broadcasters, jamming, audience research, getting started in short-wave listening. Authors whose works are included are the likes of George Wood, Tom Kneitel, the BBC's Graham Mytton, and others well known in the field. This book is \$9.99 (+ \$1.50 postage) from Miller Publishing, 424 West Jefferson St., Media, PA 19063. This company has also issued a new book on *Netherlands World Broadcasting*, as well as one called *Tune In World: A Lis-*



tener's Guide To International Shortwave Radio.

RTTY Today, by Dave Ingram, K4TWJ, is a brand new and completely up-to-date handbook on RTTY, covering all phases of this vital aspect of communications. Ingram, who is a columnist for *POP'COMM's* sister publication (*CQ* magazine), answers many questions about RTTY and delves into the use of home computers for RTTY use. Dave has written this book in a clear, concise manner, and it covers the very latest developments and techniques. It's fully illustrated with plenty of photos and diagrams, station set-ups, and RTTY gear. If you're into RTTY, or thinking about getting into RTTY, we highly recommend **RTTY Today**. It's available at \$8.95 from Universal Electronics, Inc., 4555 Groves Rd. (Suite 3), Columbus, OH 43232. **PC**

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).

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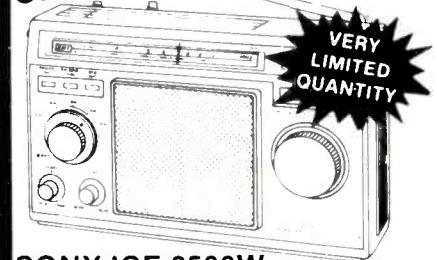
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WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

New Experimental Stations

The Commission took these actions:

KO2XAF, *Mississippi State University*, airborne within 20 mile radius of Bryan Field, MS. Station to operate on 1750 MHz to demonstrate video capability in connection with MSU/GELAC Caproni Aircraft.

KM2XMF, *Northern Telecom, Inc.*, Richardson, TX and 50 mile radius. Station to operate in 870-890 and 825-845 MHz bands to develop a competitive and efficient cellular service per report and order of Docket 18262.

KM2XMG, *Northern Telecom, Inc.*, Plano, TX and 50 mile radius. Station to operate in bands as stated in above license for the same purpose.

KO2XBM, *Pathcom, Inc.*, Harbor City, CA and 1 mile radius. Station to operate in 870-890 and 825-845 MHz bands to develop equipment for use in cellular radio service.

KO2XBI, *The Pennsylvania State University*, McAlleys Fort, PA. Station to operate on 49.80 and 49.92 MHz for high resolution measurement and analysis of winds in the troposphere and lower stratosphere.

KO2XBN, *Quintron Corp.*, Quincy, Illinois and 25 mile radius. **KO2XBO**, *Quintron Corp.*, Quincy, Illinois and 25 mile radius. **KO2XBP**, *Quintron Corp.*, Quincy, Illinois and 25 mile radius. The above stations to operate in 870-890 and 825-845 MHz bands to develop cellular base transmitters, receivers, and control equipment.

KO2XBL, *Raytheon Service Company*, Bedford, MA. Station to operate on various and discrete frequency bands from 138-17700 MHz to measure the radiation characteristics of microwave antennas being developed.

KO2XBJ, *Scientific Radio Systems, Inc.*, Miami, FL. **KO2XBK**, *Scientific Radio Systems, Inc.*, Rochester, New York. The above stations to operate on various and discrete frequencies between 1650 and 29985 kHz for development and simulated field testing of automatic antenna couplers and development/refinement of broad band antennas.

Limited Spectrum Occupancy Study

The Limited Spectrum Occupancy Study, prepared by the FCC's Field Operations Bureau as part of the Commission's data-gathering process to enable it to make an informed decision on the petition (RM-3975) by the Los Angeles County Sheriff's Department for additional spectrum, is available.

The Sheriff's Department requested additional spectrum on the grounds that the allocation is insufficient and/or unsuitable to meet current and future requirements.

The study, which will be incorporated into the record of RM-3975, has been published in two volumes. The first volume contains the body of the report. Volume II contains a listing of all the sample occupancies (in percent) by monitoring locations, frequency, day of the week and half-hour sampling period.

Copies of the report may be obtained from International Transcription Services, Room 246, 1919 M St. N.W., Washington, DC 20554; (202) 296-7322.

FCC Amends Rules Pertaining to Licensing In Various Radio Services

In line with its ongoing deregulation program, the Commission amended its rules regarding commercial radio operator licenses and the requirements for such licenses in various services.

In April 1983, the Commission issued a Notice of Proposed Rulemaking requesting comments on the following proposed changes in Rule Parts 13, 21, 73, 74, 78, 90, 94, and 95.

- The modification and, in certain instances, elimination of Commission Rules that require licensed commercial radio operators in the broadcast and broadcast-related auxiliary services
- The elimination of rules that permit only licensed commercial radio operators to perform duties in the Private Land Mobile and Fixed, Personal, Domestic Public Fixed, and Cable Television Relay Services
- The issuance of General Radiotelephone Operator licenses for a lifetime term
- Extension of the renewal grace period from one year to five years for commercial radio operator licenses that would continue to require renewal
- Abolishment of the restrictive endorsement placed on commercial radio operator licenses held by blind persons
- Elimination of the requirement that the holder of a Third Class Radiotelegraph Operator Permit repeat the Morse code test when applying for a second class license after one year has elapsed
- The abolishment of the Aircraft Radiotelegraph Endorsement

After analyzing the comments and taking into consideration recent legislation enacted by Congress relating to the Private Land Mobile and Fixed services, the Commission adopted most of the proposals as set forth in the Notice. However, it modified its proposed rule changes regarding elimination of the requirement for licensed commercial radio operators in the Private Radio Services and took certain additional actions related to those changes and to the proposal to issue

General Radiotelephone Operator licenses for a lifetime term.

With regard to the proposals concerning the Private Land Mobile Radio Service, Private Operational-Fixed Microwave Service, and the Personal Radio Services, the Commission modified its proposed rule changes to emphasize that the installation, service, or maintenance of transmitter equipment should be performed by qualified technicians certified by organizations or committee representative of users in the Private Land Mobile and Fixed Services.

The FCC said that, pursuant to Section 10 of Public Law 98-214, it endorses and encourages organizations or committees representative of users in the Land Mobile and Fixed Services to establish industry certification programs for technicians. It will, in the near future, be issuing a public notice indicating organizations that have expressed an interest to the Commission in establishing such certification programs. To be placed on this list, appropriate organizations should contact one of the individuals listed below.

It further stated that it would issue a special one-time diploma-type lifetime General Radiotelephone Operator License Certificate to existing General Radiotelephone and Radiotelephone First and Second Class Operator License holders. This special license certificate will be issued for a one year period with further details to be announced later.

The Committee adopted the remaining rule changes as originally proposed in the Notice. The rule changes concerning the elimination of the requirement that only General Radiotelephone Operator License holders perform certain duties on transmitter equipment in the Private Radio Services (Rule parts 90, 94, and 95) will be effective until 180 days after publication of the Report and Order in the Federal Register in order to allow appropriate organizations sufficient time to establish technician certification programs. The other rule changes to Parts 13, 21, 73, 74, and 78 will be effective 30 days after publication of the Report and Order in the Federal Register.

Request For Reinstatement Of Application Denied

The FCC denied the request of The Guardian Alarm Company of Michigan for reinstatement of its application for an 800 MHz Specialized Mobile Radio System (SMRS) in Southfield, MI, near Detroit.

The application had been dismissed by the staff for being late-filed, arriving at the Gettysburg licensing division April 20, 1983, five days after it was due.

On February 23, 1983, the Commission issued a public notice specifying the pro-

cedures to be followed by applicants for 800 MHz frequencies in the Detroit, MI, and Cleveland, OH areas. It indicated that applications such as Guardian's should be submitted to the Private Radio Bureau's Licensing Division in Gettysburg, PA by April 15. Guardian submitted its application to the Office of the Secretary of the Commission in Washington, DC, on April 15. It was forwarded to Gettysburg, arriving there April 20.

On June 17, 1983, Guardian asked the bureau to reinstate its application on the basis that submission to the Office of the Secretary constituted a timely filing. The bureau denied this request.

On August 16, 1983, Guardian asked the Commission to renew that decision, again contending that submission of its application to the Secretary constituted a constructive receipt of the application by all branches of the Commission.

The FCC said Guardian failed to present any unique or compelling reason to justify its failure to conform to the Commission's rules, which require filing with the licensing division, and the explicit terms of two public notices giving filing instructions.

Flight Test Stations In 2310-2390 MHz Band Proposed

In response to a petition by The Aerospace and Flight Test Radio Coordinating Council (AFTRCC), the FCC has proposed amending Parts 2 and 87 to permit the operation of aeronautical flight test telemetering airborne stations (flight test telemetry stations) in the 2310-2390 MHz band.

The Commission also clarified its rules governing such operations.

Flight test telemetry stations are used to transmit diagnostic test data during the research and development phases of manned and unmanned aircraft, missiles, booster rockets, and other expendable vehicles or their major components. In this country, government agencies and non-government FCC licensees are authorized to use flight test telemetry frequencies in the 1435-1535 MHz band on a shared coordinated basis. AFTRCC is recognized by the FCC as the frequency coordinating advisory committee for non-government flight test telemetry station assignments.

The 1435-1535 MHz band was allocated for flight test telemetry operations in 1958. As the number and complexity of flight tests have increased, the 1435-1535 MHz band has become congested. In 1979 the WARC approved the use of the 2310-2390 MHz band by flight test telemetry stations that operate in the United States and its possessions. The Commission's rules have been amended to provide for this allocation.

In addition to proposing use of the 2310-2390 MHz band for flight test telemetry stations, the Commission proposed:

- Eliminating the rules specifying certain telemetry frequencies for assignment to manned flight test telemetry operations and

others for assignment to unmanned flight test telemetry operations

- Limiting the maximum power output for flight test telemetry transmitters to 25 watts
- Permitting wider channel bandwidths to accommodate the greater amount of data required from advanced flight test vehicles
- Permitting telecommand operations associated with flight test telemetry to share the telemetry channels.

Inquiry On Future Public Safety Requirements

The FCC began an inquiry leading toward development of a plan to ensure that current and future spectrum requirements of state and local public safety authorities are accommodated in allocations of the electromagnetic spectrum. As a first step towards developing the plan, this inquiry solicits comments from public safety authorities and the public which will enable the Commission to perform a study to identify the spectrum telecommunications requirements of public safety authorities and the need for contiguous spectrum on a national basis.

Specifically, the Commission asked for comments on the problems of existing public safety communications systems; the anticipated growth of these systems; possible new applications of radio; whether new operational configurations result in requirements for additional communications capacity; and how these needs can best be met.

The Commission said that several events have led to its conclusion that the time has come to reexamine the communications needs of public safety entities and the efficacy of its existing spectrum management policies to meet those needs:

- The Private Radio Bureau released a report in which substantial land mobile spectrum shortages and a continued increase in public safety stations were projected
- A petition filed by the Los Angeles County Sheriff's Department requesting additional frequencies for public safety use due to currently existing spectrum shortages in some areas of the country
- The Authorization bill for the Commission for FY 1984 and 1985 (Public Law 98-214) amends the Communications Act to provide for expenditure of funds during those years to establish a plan to ensure that the needs of public safety entities will be accommodated in the agency's spectrum allocation proceedings

The Commission said that its inquiry is an initial step towards meeting the requirements of Section 9(a) of the Authorization Act (PL 98-214). Other requirements of Section 9 will be addressed by the Commission as it proceeds to establish a plan to ensure that public safety needs are taken into account in spectrum allocation matters.

Reimbursement Of Costs For Volunteer-Administered Amateur Radio Exams?

The FCC proposed amending its rules to implement Public Law 98-214, approved

last December 8, which amended the Communications Act to provide for reimbursement of out-of-pocket expenses incurred by volunteer examiners (VEs) or volunteer examiner coordinators (VECs) in connection with the preparation, processing, or administration of examinations for amateur station operator licenses above the Novice class.

Specifically, the FCC proposed that:

- The total allowable cost to be reimbursed per examinee may not exceed \$4.00, which can be adjusted each January for changes in the Department of Labor Consumer Price Index.
- The amount of reimbursement from any examinee for any examination or series of examinations related to a single application may not exceed the published maximum
- VEs or VECs maintain records of the out-of-pocket expenses and reimbursements and certify to the FCC annually that all reimbursed expenses were necessarily and prudently incurred
- The VEs and VECs make arrangements among themselves for collection and distribution of the reimbursements

The Commission noted that it would continue to administer some examinations in its field offices and at a few remote points this year until such time as the volunteer program is in place. Pointing out that it wanted to implement the volunteer program as soon as possible, the FCC said it would allow 30 days for comments on its proposals, with replies due 15 days thereafter. **PC**


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Beaming In (from page 4)

erations to be taken into account regarding the privacy of certain communications. Although there are those who can and do wave around Section 605 to produce a few specific results, there's a lot missing. There are too many loose ends and unanswered questions.

Cordless telephones, used today to carry so many of our conversations, are not cov-

ered under Section 605 since they are not eligible for licensing by the FCC. Are American ships and aircraft covered by Section 605 when they are located overseas? Probably so, but what about ships and aircraft of other nations (which do not have a communications privacy law) while they are in their own or American territory? What about Americans monitoring communications from foreign stations located in their own nations? What about bootleg stations or those used

for illegal purposes? By what logic could one hope to apply Section 605 on a practical level to CB'ers who "read the mail" on Channel 19 and pass along traffic reports to in-transit vehicles—a probable violation of Section 605! By what rationale could one hope to regard as "private" those unscrambled voice communications exchanged over frequencies that can be received on millions of receivers in the hands of the public? It is beyond naivete to assume that people aren't going to monitor such transmissions for all sorts of reasons—mostly harmless ones, just as listening in on the neighbors' party-line telephone calls has been a semi-respectable pastime for the past 70 years.

Hope you didn't think that I was going to offer an instant solution or answer to the Section 605 dilemma all wrapped up in a tidy and concise paragraph. You've already seen what happened with the one-paragraph gem called Section 605. Under the existing Section 605, you're either guilty or innocent without any consideration for the circumstances surrounding the situation—a linear logic which seems more suited to use by computers than by people. That's what you get with an oversimplified one-paragraph "thou shalt not" law directed at a highly complex matter. Maybe a proper radio communications privacy law will fill up many pages—like the Public Law 90-351 which seeks to offer regulations against illegal wiretapping, but which is meaningless in the many instances of supposedly "legal" wiretaps. It's unfortunate that many of our contemporary problems appear to have good and bad aspects regardless of the angle from which they are approached.

Certainly new legislation would (or should) recognize that there are several degrees and categories of privacy invasions to be categorized and considered. Consideration would have to be given to the mode in which the violated message was sent (voice, RTTY, CW, etc.), the nature of the communications and those sending/receiving them, the amount of deliberate security available or taken by the sender/receiver, the intent of and benefit gained by the alleged transgressor as well as the means used for the alleged transgression, what was done with the information obtained, the claimed damages sustained because of the alleged violation—well, you get the idea. These are just a few of the factors which must temper all considerations.

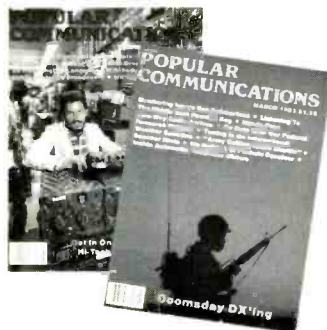
For the present, we have the all-purpose law on the books and I, for one, do not suggest that anybody bend, dent, or break the law. However, for practical purposes, you don't have to look very hard to see that this tired old statute lives up to the adage that when you seek to become everything to everybody you usually end up being nothing to anybody.

The 100-in-1 miracle kitchen aid ended up in the oblivion draw after one day of use. Section 605 has been around for 50 years. Let's put it into the oblivion draw and get something better.

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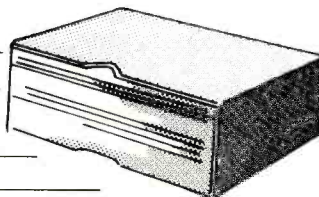
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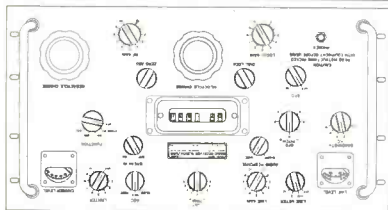
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AD INDEX

Ace Communications	17
Alpha Delta Communications	54
All Electronics	49
Antenna Specialists Co.	73
Auburn-Wolfe Pub. Co.	61
Barry Electronics	75
CBC International	56
CCS Comm. Control, Inc.	37
CRB Research	51
Communications Electronics	2
Computer Trader	21
DNE Inc.	69
EGE, Inc.	9
Electra Co.	Cov. III
Electronic Equipt Bank	1, 62
Elephant Electronics, Inc.	73
Fair Radio Sales	75
G.I.S.M.O.	59
Gilfer Shortwave	75
Ham Mastertapes	Cov. II
Ham Shack	63
Hamtronics, Inc.	9
Hustler, Inc.	4
ICOM America, Inc.	Cov. IV
Kalglo Electronics	31
Litsche Co.	76
MFJ Enterprises, Inc.	4
Meshna Inc.	14
Metz Communication Corp.	63
Micro Mart	5
Microlog Corp.	13
Miller Publishing	75
Morning Distributing	67
Music City Ham Shack	21
PopComm Book Shop	71
Radio West	69
Radio World	21
Spartan Supply Co. Inc.	31
Spectronics, Inc.	71
Springhouse Energy Systems	61
Stano Components	17, 69
Telco	61
Unique Communications	75
Unity Electronics	59
Universal Electronics	69
Universal Shortwave Radio	15, 67
Viking International	11
WRNO Radio	75
Westech Electronics	22
Western Radio	73



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