ICD-08635

POPULAR COMMUNICATIONS

JULY 1983 $1.75

The Inside Story On "ECM"— Electronic Warfare Trickery!

- Secrets Of Scramblers
- Build An Itty-Bitty DX Antenna
- How The Russians Bugged Our Embassy
- Scanning The Pennsylvania State Police
- 100 DX Countries In A Weekend
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- POP'COMM Scans: America's Great Breweries
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IC-R70

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

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DESIGN

The R70 incorporates an UP conversion system, utilizing a direct feed mixer proven to be the best design for minimizing interference from strong adjacent signals. A preamp is provided for making the weakest of signals readable. High grade filters in conjunction with the built-in PBT (pass band tuning) system and notch filter, provide the ultimate in interference rejection. Selectable AGC (fast/slow/off), noise blanker (wide or narrow), and tone control improve readability under the worst conditions. An AGC derived squelch, operative in all modes, adds to operating ease.

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SWL'ING

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

PRICE

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CIRCLE 75 ON READER SERVICE CARD

ICOM The World System

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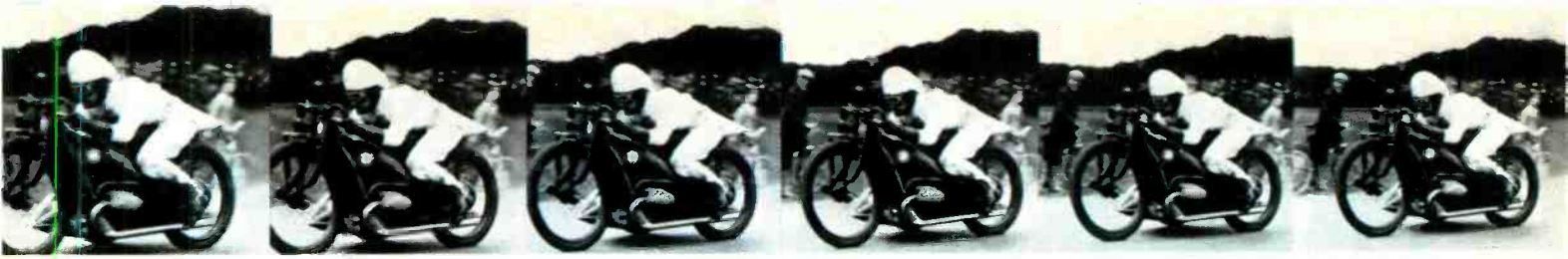


INTRODUCING THE LATEST HEIR TO 59 YEARS OF GERMAN ENGINEERING.

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

The drafting tables of German engineers.

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

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

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

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

Even the wheels of the LS possess a beauty that goes far deeper than their gleaming enamel. Each rim section is made of a highly rigid aluminum alloy; each hub and spoke assembly is separately cast from a far more elastic aluminum alloy to provide added flexibility. And then everything—hubs, spokes and rims—is cast as a single unit. Culminating in an exceedingly resilient "composite" wheel that not only helps increase handling prowess but decreases unsprung weight.

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

Its price? A lofty $3,790.*

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

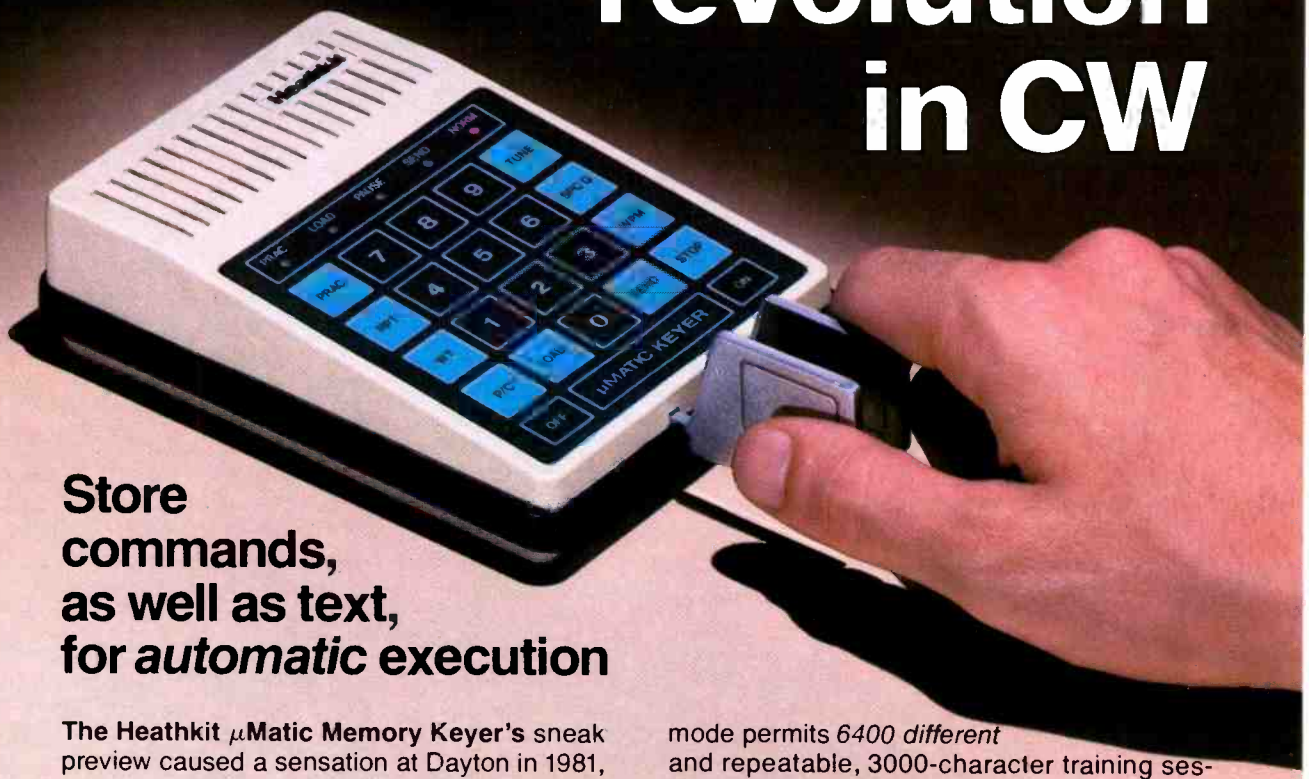
*Manufacturer's suggested retail price $3,790. Actual price will depend upon dealer. Price excludes state and local taxes, dealer prep, destination and handling charges. © 1982 BMW of North America, Inc. The BMW trademark and logo are registered trademarks of Bayerische Motoren Werke, A.G.

THE LEGENDARY MOTORCYCLES OF GERMANY.

BMW

CIRCLE 151 ON READER SERVICE CARD

The Memory Keyer that started a revolution in CW



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The Heathkit μMatic Memory Keyer's sneak preview caused a sensation at Dayton in 1981, and the excitement is still running high. *Ask about it on the air.* Those who own one will tell you it revolutionized their operating practices, eased their hand fatigue, multiplied QSOs – and increased the number of incoming QSLs. In contest, you can prove it's the best every time.

Inside, a custom microprocessor stores up to 240 characters of text or commands. *Variable-length buffers* eliminate wasted memory space. *Command strings* let you sequence speed, weight and repetition alterations or text in any order you desire. Choose the speed (1-99), any of 11 weight settings, plus spacing and message repeat count, then sit back and collect contacts...

Capacitive-touch iambic paddles unplug and store inside the keyer when not in use. Left handed? A two-key function will reverse the paddles! Or a socket will connect to your favorite keyer. To boost copy, a 4-level random 'practice' mode permits *6400 different* and repeatable, 3000-character training sessions at any speed you like.

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AM-422R1

CIRCLE 180 ON READER SERVICE CARD

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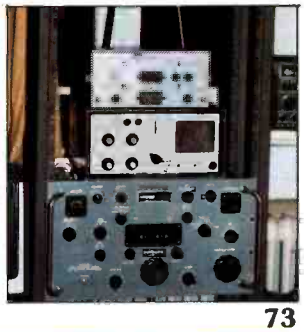

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FEATURES

This month's cover: *Courtesy U.S. Army.*

DEPARTMENTS

BEAMING IN

BY TOM KNEITEL, K2AES

AN EDITORIAL

Dishing It Out

Pity the poor big business cable TV services. They are using the public airwaves to send their signals, their satellite hardware is parked out there in the never-never land which is the property of all of the planet's residents, and yet they're squawking. Among the things they're not all that happy about are companies that make and sell the hardware to permit individuals to receive their signals. Fact is, they want to have the right to say who shall and shall not receive the signals their satellites and other transmitting facilities are sending out over the airwaves.

The owner of an earth station installation and teleconferencing installation in my own community recently said, "They're trying to stamp out competition." Although reception of satellite signals is not presently illegal, this fellow claims that at least some of those in the cable TV signal industry would very much like to make it illegal for you or me to pick up their signals directly.

Right now, in certain metropolitan areas, the public can buy small microwave antennas and converters which permit reception of signals terrestrial cable TV system transmissions used to distribute programming material from commercial earth stations to the cable TV companies. This isn't even a question of picking up signals directly from satellites and, in reality, would not appear to be much different than using a scanner to monitor local taxi company operations. Nevertheless, the cable TV industry has official looking "agents" wandering through the streets looking at roof tops to spot the little antennas. When one is noticed, its owner is approached and given the news that they must immediately remove the "illegal" equipment from their property. Unfortunately, this sleazy and misleading stunt seems to produce results since the "agents" appear to be quite "official" and their words *seem* to carry both truth and authority.

Of course, recall that it wasn't that long ago when the SCA (background music) industry was able to get a large major electronics manufacturer to remove from the marketplace a line of FM broadcast receivers that had the ability to pick up these "hidden" signals which piggyback on FM broadcast station transmissions. SCA companies still send "agents" around to stores and cocktail lounges suspected of "illegally" playing their background music—and those "caught" are given a considerable amount of hassle. Their fudge factor is that by playing this music for their patrons, they are not only making commercial use of it, they are in violation of Section 605 of the Communications Act (secrecy of communications).

At the present time, it seems that many people in the satellite TV reception industry seem to regard Home Box Office (HBO) as the prime ogre, since HBO recently announced that it would begin scrambling the signals it sends out to its 4,400 American affiliates. Such scrambling will prevent direct reception of HBO's satellite signals by TV sets connected to the approximately 60,000 to 100,000 privately owned satellite dish antennas in the U.S. HBO's claim is that dish owners are stealing these signals (as if the signal strength were being diminished or degraded by the reception) and are a revenue loss to HBO, a unit of Time, Inc.

Various subscription TV services such as HBO, Showtime, ESPN, etc., have long denied requests from people wishing to have their own individual subscriptions, even in areas where the services are not available for local cable franchises. That being the case, it hardly seems logical to consider direct reception either revenue loss or stealing, and makes it all the more curious to learn that HBO will be spending almost $9 million to foil the efforts of maybe 60,000 viewers, many of whom would be willing to pay for the services if only they could! This is a somewhat monopolistic—some would perhaps call it "dog in the manger"—attitude, to say the very least.

A Washington-based group called SPACE (which represents 1,000 earth station owners, installers, and manufacturers) has said that HBO is using the issue of "lost revenues" as a smokescreen to mask a desire to hinder competition for Time's American TV & Communications Corp. cable franchises from the various new Direct Broadcasting Satellite (DBS) services. In order for DBS to be successful, there would have to be far more earth stations than there presently are.

The Washington attorney representing SPACE, Fred Finn, says "The only competition [for ATC] comes from direct satellite communications of the type our members are engaged in." SPACE has sponsored efforts to have earth station owners pay HBO and other programming services for the rights to use their services. Finn has also stated that calling owners of earth stations "pirates" is both incorrect and defamatory.

Finn claims that the earth station industry has proposed a point-of-sale license, with revenues going to the copyright owners. He says, "That has been ignored by HBO and rejected by the Motion Picture Association

(Continued on page 6)

POINTED QUESTIONS DESERVE SOLID ANSWERS!

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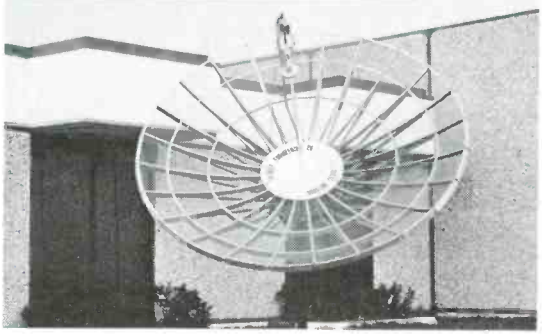

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CIRCLE 72 ON READER SERVICE CARD

Beaming In *(from page 4)*

of America; HBO has taken a position that they don't want to deal with this market."

On the flip side of the problem, when asked why the programming services won't deal with dish owners, a spokesman for ESPN said that the sports subscription service won't accept payments from individuals because opening accounts for a large number of individuals would cause "colossal" bookkeeping problems. Also, he claimed, it "undercuts the relationships we have with the affiliated cable systems."

The ESPN spokesman agreed that a point-of-sale royalty arrangement would cut bookkeeping problems, but he said that ESPN hadn't been approached with such a plan and, for the time being, had no plans to modify the network's policy towards dish owners.

Allan Raphael, an analyst for the New York investment firm of Arnhold & S. Bleichroeder, says that he agrees it isn't a good idea for these companies to open up individual subscriber accounts. He explains, "You have to control your source of distribution. You can't reply upon the good will of people to send you a check every month."

He feels that HBO is not so much concerned with individual dish owners as they are about those who would install a dish to feed programming into an apartment complex, for the fees which might be paid for such installations wouldn't add up to the revenues HBO would normally expect.

But when they get to the end of the moralizing and other factors, the question remains of whether or not dish owners are actually breaking the law when they tune in on signals without being given permission to do so by those who send out the signals. This all hinges on the interpretation one gives Section 605 of The Communications Act of 1934. Section 605 prohibits unauthorized publication or use of communications signals; standard radio and TV broadcasts, signals from ham operators, and distress signals are exempt.

SPACE's Finn said that private use in the home doesn't conflict with the law because the contents of the broadcasts aren't "divulged" in the terms of the statue, and, as long as no videotape copy is made, there is no copyright violation.

Not so, says Sharon Kelley, an FCC attorney. Kelley takes the postion that under the terms of Section 605, all unauthorized viewing of subscription services is illegal. The issue has never been tested in the courts, although there is less controversy about the practice of actually tapping into a cable for TV reception since that is clearly illegal. As for using an unauthorized descrambler on a subscription TV channel or picking up point-to-point microwave TV transmissions, there are as many persons claiming that such practices are legal as there are those who claim otherwise.

There will be no quick answers or solutions forthcoming and certainly there will be many more questions raised before there are serious attempts made to bring forth definitive and clear cut answers.

Through it all, I can't help but feel that all of this carries the potentials or seeds for an entire series of yet unmentioned "problems" that could possibly arise concerning the right of individuals to listen to all non-broadcast and non-ham signals by means of scanners and communications receivers. When the dust settles on this whole question of the public's right to freely receive signals sent out over the airwaves (which are a publically owned natural resource), it could end up with the rights of individual citizens abridged and restricted. Once something like that happens, just wait and see what they'll come up with next—and they'll have lots of new laws to give it teeth!

So, even if you are not at the present time directly involveed in or affected by the outcome of what happens to owners of earth stations, it behooves you to support the efforts of those seeking to retain the long-standing rights of Americans to freely monitor (for their own personal uses) any signals sent out over the airwaves. I can assure you that this is a right you will eventually miss, even if the first stage of its removal takes place outside your scope of interest.

MAILBAG LETTERS TO THE EDITOR

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

We Didn't Get His Goat

I'd like to comment on that story about the "Amazing Goat Gland Radio Station" in the February issue. When I was a youngster, I remember my parents listening each evening to Doc Brinkley's broadcasts, although it wasn't until I read the story in *POP'COMM* that I really knew the full story behind his broadcasting career. Bravo! Not only was this one of the funniest stories I've ever read, but also one of the most interesting and informative. Let's have some more like it. All in all, *POP'COMM* has just what I've been seeking for a long time. Just keep doing whatever it is you've been doing.

Ed McGuire
Lincoln, NE

Many readers seemed to like the story about Doc Brinkley and we will be planning additional stories on some of the unusual and lesser known stations and personalities connected with communications and broadcasting throughout the years. Being a radio enthusiast, I've long been interested in locating a magazine that covered those things that I found most fascinating. Unfortunately, there never seemed to be a single publication that covered those particular things that fascinated me the most. In fact, most magazines never bothered with them at all; yet many other enthusiasts to whom I'd spoken over the years seemed to share my interests. Obviously, I wasn't the only person who was interested in the kind of information which had so long been passed over by other publications. —Editor

Free Radio Movement —What?

Let me congratulate you on Al Muick's Free Radio Focus column. It's the page I turn to first when my copy of *POP'COMM* arrives each month. I wish the column were at least twice its existing size and, through the column, I have greatly increased the number of loggings (and QSLs) from these fascinating broadcasters. Could you recommend any clubs which cater to persons who specialize in monitoring Free Radio (pirate) broadcasters?

Martin L. Balsam
Milwaukee, WI

There are, at any given moment, a couple of club-like organizations in operation which claim to cater to this field. Several have been pretty good. However, the few such groups in current operation seem hardly worthy of recommendation, being mired knee-deep in petty personality squabbles, jealousies, and politics. The fact is that some of the more vocal people in these groups have probably done more harm to "the cause" than any group of FCC monitors! Your best bet is to check with some of the regular general-coverage DX clubs to see if their DX publications presently cover unlicensed broadcasters (their policies on this seem to change from time to time), since the larger general-interest clubs tend to steer clear of the personality politics in which the smaller, more specialized clubs are drowning right now.

Mystery Signal

I'd like to report a strange signal on 1622 kHz. It's on the air in the evening and appears to be some sort of pirate broadcaster (and the frequency would seem to make it so), except that all it programs is news (Group W Satellite News) and nothing else. Has any other listener reported hearing this mystery signal? Can it be identified?

Chester Connolly
West Chester, PA

Many readers from all areas have reported this station, and it appears that the first one to get a handle on it was listener Vince Pinto of New York State, who says it's not a pirate at all! Vince advises that this is a 100 watt transmitter (5 foot monopole antenna) operated by the Group W Satellite News Channel at 1111 18th Street N.W., Washington, DC. The purpose of the transmitter is so that news vans in the Washington area can hear what's being broadcast in order to get their "cues." The callsign of this station is WJZ-PB. This type of operation appears to be something newly authorized and several other stations have been given permission to run similar transmitters. The frequencies the FCC is to permit these operations on are 1606, 1622, and 1646 kHz. Add these stations to the pirates, the cordless telephones, utility signals, and aero beacons already occupying the 1600 to 1700 kHz band and you've got a pretty strange mix! —Editor

Must Have Been Something We E.T.

Your Beaming In editorial last October on SETI (Search For Extra Terrestrial Intelligence) brought up many interesting thoughts on the topic that had never occurred to me previously. Still, the whole concept of actually devoting serious effort to such a search seemed quite remote. Little did I know that your Beaming In came only five short months ahead of the official announcement that SETI was to commence at the Oak Ridge Observatory in Harvard, Massachusetts. Can you give a brief summary of this experiment since my local news media really didn't say much about what they're going to be doing?

W. N. Margolin
Anniston, AL

The current SETI experiment will be running at least until next March, using an 84-foot radio telescope which will be operating on a round-the-clock basis. The antenna will be surveying about 68% of the sky, checking from −30° to +60° in declination a group of frequencies emitted by atomic or molecular clouds in interstellar space. The radio receiver being used is called the "Suitcase SETI," dividing what the antenna picks up into 131,072 separate and narrow (0.03 Hz) frequency bands. They're checking to see if any of the bands contain unusually strong or unexpected types of signals or pulses which could represent attempts at deliberate communications or beacons. The hope is that these frequencies might be known to any civilization that had developed radio astronomy, and that such civilizations might use such frequencies to send out a signal. In the meantime, NASA is developing a frequency analyzer which covers a wider frequency range and will sample eight million channels. This equipment will have less selectivity than the "Suitcase SETI," offering only 1 kHz resolution. The "Suitcase SETI" was developed by scientists of Harvard University, Stanford University, and NASA's Ames Research Center. Funding for the current project comes from the Planetary Society, a private organization. —Editor

The Wrath Of Kahn

Although I've found much in *POP'COMM* to like, I must reprimand you for offering a lot of your own personal opinions on various topics. These seem especially prevalent in the Beaming In and Mailbag sections of the magazine. Please just stick to basic factual matters and sign off with what you personally think of this or that station, club, publication, equipment, or whatever. Most of your opinions absolutely infuriate me, and this is nothing new with you either. I disliked your opinions even when you were dispensing them 20 years ago in *Popular Electronics*, and later in *Electronics Illustrated*. Who the hell cares what you think?

Bradley R. Kahn
Los Angeles, CA

Obviously, Brad, you (for one) care what I think or else you wouldn't be writing to express your own opinions. And if I wished to silence you from expressing your opinions, I wouldn't be running your letter in Mailbag. I can't imagine why you feel somehow threatened by my opinions. If it will make you feel any better about things, lots of folks don't like my opinions. The trick with getting away with expressing one's opinions is to always make certain that no more than 49% of the readers become infuriated at any particular opinion in a given issue. Be advised that I have you punched into the computer as having a long-term and continuing blanket negative vote on all past, present, and future opinions. —Editor

An AN/TLQ-17A tactical communications electronics countermeasure system (nick named "The Traffic Jam"), was mounted in the Dragoon armored wheeled vehicle during recent exercises at Fort Lewis, Washington. (U.S. Army photo)

A POP'COMM Intelligence Report

"ECM" – Electronic Countermeasures

Using Communications To Make The Enemy Think You're Somewhere Else!

BY TOM KNEITEL, K2AES, EDITOR

Radio has played an ever-increasing role in warfare since its first appearance in the trenches of World War I. As technology advanced, governments devised many fascinating uses for this tool which went far beyond its basic deployment for two-way communications. It became a means of disseminating propaganda, a way of determining the distance and direction of the enemy, of calculating the altitude of an aircraft. When combined with other weapons, it was used for guidance purposes. Actually, it seems that there are now few wartime tasks which can be easily accomplished without radio (in one form or another) playing its part. It is because of this reliance and dependence upon the versatile aid we call radio that the art and science of electronic countermeasures (ECM) was born. In its basic form, ECM sets out to use the enemy's reliance upon radio in order to fool ("spook") him, cause his weapons to malfunction, or otherwise cause him vexation and eventual defeat.

ECM is a term now applied to a variety of devices and techniques that can be used to confuse and misdirect many types of guided missiles launched against aircraft and ships as well as other tactical targets. ECM is also employed to "blind" enemy radar, confuse and confound its operators, and generally disrupt the vital communications of the enemy. This is electronic warfare in one of its most sophisticated guises. ECM, although it was known and used in World War II, really came into its own well after that war. By 1958, the Department of Defense was spending close to a half-billion dollars for ECM; that was 10% of our entire defense budget and more than was spent on ECM in the almost four years we fought during World War II. If you have a good calculator with a lot of LEDs, you can try playing with figures to guess how much we are spending on ECM based upon our current defense budget!

Probing

Because electromagnetic radiation from enemy (and our own) radars and communications equipment penetrates beyond national boundaries, a form of limited electronic warfare always exists and is being waged as nations now routinely use electronics to probe behind other nations' borders. This is done to assess the defenses and military capabilities of others.

The objective is to determine the locations of radar and communications transmitters and to analyze the operating characteristics in order to develop ECM capable of jamming or confusing that particular nation should it become an enemy. This electronic probing, or reconnaissance, can be carried out by aircraft, submarines, mobile and portable units, and even from fixed stations equipped with sensitive radio and radar receivers and associated equipment designed

to record and analyze characteristics of each transmitter monitored. From time to time, a probing aircraft, submarine, surface vessel, or even portable or mobile ground unit gets too close, and an "international incident" takes place; but, the probing goes on. Remember Francis Gary Powers and his U-2 spy plane over the USSR? Recall the ill-fated USS LIBERTY off the coast of Israel?

Passive ECM

One of the simplest types of ECM, and one of the first types used in World War II, is called *passive* ECM. The term passive implies that the device or technique does not itself transmit any electromagnetic radiation, but seeks to change the nature of the enemy's radar signals or prevent them from returning to their source.

Probably the best known example of passive ECM is called *chaff,* or sometimes by its World War II code name of "window." Chaff consists of thousands of strips of tinfoil or aluminum foil which are dumped overboard from an aircraft. These produce the effect of false targets on radar scopes by reflecting back some of the radar signals. By proper seeding, it's possible to lay down a sort of chaff smokescreen which obscures attacking aircraft from air defense radars.

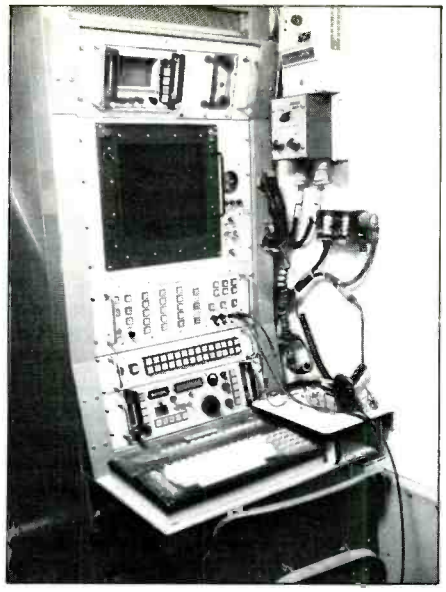
The first recorded use of chaff in WWII was made by the British in July, 1943 against the deadly effective German anti-aircraft radars. The results, to quote a then-secret U.S. Government report, were nothing less than "spectacular." Royal Air Force losses were cut to a small fraction of those suffered in earlier attacks. German radar operators thought there were twice as many aircraft than there actually were.

The slow speed of WWII bombers resulted in a sufficiently small speed differential between aircraft and drifting chaff to make it difficult to distinguish chaff echos from those of the aircraft. Today, however, with modern military aircraft surpassing the speed of sound, simple chaff has become less effective and eventually evolved into the development of more sophisticated types of ECM.

It became possible to design and build devices which focus radar energy as much as a parabolic mirror reflects and focuses light waves. The radar reflector often seen on the masts of sailboats, consisting of a few flat metal plates made into a three-dimensional diamond shape, is similar to earlier models designed to be used in ECM. On sailboats, they provide a radar target that can be easily seen by large radar-equipped vessels.

For ECM use, one or more similar reflectors can be mounted on a small missile or drone aircraft. It will reflect back a much stronger echo than normal to the radar for so small a vehicle. As a result, the missile or drone can appear to be a full-sized bomber, misleading ground defense radars.

After the Normandy invasion in WWII, the Allies outfitted a group of small motor launches with these "corner reflectors," which made them appear to be the size of a fleet of cruisers on German radar scopes.



The AN/MLQ-34 TACJAM is a ground based mobile electronic warfare system that provides jamming support to the army. This system can obstruct and deceive multiple communication nets. (U.S. Army photo)

The TACJAM is normally deployed in an armored vehicle for rapid mobility. (U.S. Army photo)

These decoy boats made diversionary feints along the coast and fooled the enemy at least long enough to buy the valuable time to bring off the invasion at Normandy.

It was only a few years ago that someone in the Carter administration "leaked" information to the media that the U.S. had secretly developed a military aircraft which, because of its design and the materials used, would simply not show up on enemy radars. This was the *Stealth* bomber, and it appears to be the realization of a longtime dream akin to discovering perpetual motion. For decades, amateur inventors had been trying to figure out how to develop a paint which would make objects invisible to radar.

Another approach to foiling radar is the use of destructive interference—similar to the anti-reflection coating used on camera lenses. The Germans developed, and reportedly used, such radar camouflage on U-boats during WWII. The serious shortcoming of this technique is that it is very frequency sensitive. That is, it can conceal the object from radar reflections only for a relatively narrow band of radar frequencies. The Stealth bomber surpasses these limitations.

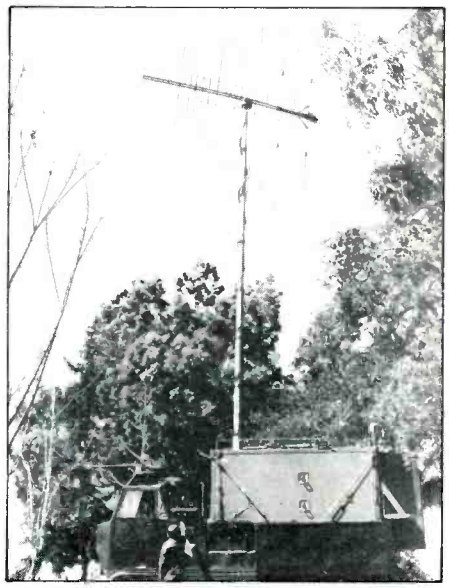
Active ECM

The major portion of ECM efforts are devoted to more "active" countermeasures—equipment which generates electromagnetic radiation intended to overpower the enemy's radio-radar signals, to irritate, mislead, or confuse its radio operators and all those along the chain of command who depend upon the information and messages given out by those operators.

The most elementary form of active ECM is simple jamming, although that term is loosely applied to all types of active ECM. One of the earliest and simplest forms of jamming used a spark gap to generate brief, jagged peaks of noise through which no intelligence could pass.

When this or similar types of jamming are employed against enemy radio communications, the enemy might (for instance) have to resort to more powerful transmitters to get through or change frequencies or transmission modes. Perhaps the enemy does not readily have more powerful transmitters or radios that can shift to unjammed frequency bands, or that can change operational modes. Until he can make other arrangements, his radio communications abilities are either impaired or totally destroyed.

Jammers don't always have to be high powered jobs to do their damage, since certain types of signals may be sent out that don't require a lot of RF clout to accomplish



The TACJAM electronic warfare system can be set up in a very short period of time at locations very close to the front lines. Its directional antenna can be aimed directly at the communications to be disrupted. (Photo courtesy of Sylvania Systems Group, GTE Products Corp.)

The LQ-102 is a small jammer which operates between 30 and 76 MHz. It is made solely for the military and is not available commercially. (Photo courtesy Cincinnati Electronics Corp.)

their mission. For instance, using a sequence of different audio tones ("bagpipes") repeated over and over again not only effectively masks most types of messages, but is also rather irritating to monitor for more than a few minutes. Low powered automatic jammers can be dropped to locations behind enemy lines by aircraft or can be delivered by missiles.

Because radar receivers are designed to operate from extremely low level echos, the power output of a jamming transmitter can be only a few watts, or several hundred at most. A potent way of jamming ground radar searching for aircraft is by simply dropping a small radar transmitter attached to a parachute from an aircraft.

Radar has two basic means for establishing the bearing and distance to its target. The direction in which the radar antenna is pointing when the echo is received establishes the bearing to the target, and the transit time for the radar pulse to travel from the antenna out to the target and back determines the distance to the target.

One way to fool radar is to design an ECM transmitter, for aircraft use for example, so that it transmits a series of pulses each time it receives one pulse from the enemy's radar. The ECM gear obviously must be able to operate on the same frequency and with the same transmission characteristics as the enemy's radar.

The enemy radar will then receive a series of echo-like signals from the ECM unit, each delayed slightly from the other. This will produce a series of target blips on the radar scope, each at a slightly different range; the radar operator will not be able to tell the difference between the true target and the counterfeit targets.

Enemy interceptor aircraft and missiles, which employ radar for guidance to their targets, must have accurate information on target range in order to determine where to aim. If, for example, a bomber under attack carries ECM equipment capable of creating false range information in the interceptor/missile radar, the latter will be misguided and the bomber will escape. Virtually all modern military aircraft carry active and passive ECM equipment.

ECM equipped missiles may be launched from aircraft under attack to lure away attacking missiles or aircraft. They may be used to jam enemy ground installations or even spread a smokescreen of chaff.

Fundamentally, any missile that employs radio, radar, or infrared for guidance can be jammed or fooled by ECM. Only weapons that are guided by wire or their own internal guidance systems stand any chance of escaping the electronic trickery of ECM, and this is the reason why such systems had to be developed. Communications techniques intended to get around ECM are also in use by military forces. These are known as electronic counter-countermeasures (ECCM) and are a study in themselves.

ECM Hardware

Here's an insider's look at some of the ECM equipment used by many modern military forces.

France has a 1 kW mobile jamming station which can monitor and locate enemy signals, as well as perform highly detailed analysis of the signals and then jam them on any frequencies from HF to UHF. The *Binoc* and *Bromure* are two classified French communications jamming transmitters.

Great Britain has its RJS-3100 VHF jammer made by Racal Communications. This incorporates two 16-channel scanning receivers (Racal type PRM-4090) to monitor frequencies in the range of 20 to 80 MHz. When a signal is detected on any of the preset enemy frequencies, the jammer activates and blanks out communications on that frequency within one second. Since the jamming takes place only while the channel is active, the RJS-3100 can actually be used to disrupt a great many different enemy communications frequencies.

The United States has an LQ-102 hand-emplaced training jammer used to produce ECM during our own military maneuvers. This small unit sends out an FM noise jamming signal from 30 to 76 MHz. Battery powered and completely self-contained, it can be transported and placed in operation by a paratrooper. Completely waterproof, it can be left operating unattended, although provisions are made for remote controlling it (by wire) from a distance of six miles.

Our AN/TLQ-17 is an ECM set covering the frequency range of 1.5 to 80 MHz. The transmitter puts out 550 watts and the unit can be used either on the ground or while airborne.

The AN/ALQ-97 is an airborne jammer which runs high power.

The AN/GLQ-3 is an all solid-state high powered communications jammer intended to wipe out enemy voice and data communications. This equipment is installed in a truck. Operational frequencies are in the 20 to 30 MHz band, and it runs 1500 watts. Two antennas are used, one omnidirectional and the other a high gain directional type.

The AN/MLQ-34 (TACJAM) communications countermeasures system is a mobile ECM system used to knock out communications over a broad range of frequencies with several kilowatts of power. Several transmitters and receivers are employed in order to provide maximum potency. This is combined with a wide range of jamming modes that can be effectively employed to jam virtually any type of transmission. This equipment is mounted in an M-548 tracked cargo carrier. The antenna is a log periodic type.

U.S. Army photo

U.S. Army photo

The AN/ALQ-130 is a proposed jammer to be deployed in U.S. Navy attack and fighter aircraft. It's proposed to be used to foil surface-to-air missile guidance systems as well as enemy ground communications. It can jam individual frequencies or can be set for broadband operation using noise or acoustic sounds to do the job. This is an updated version of the AN/ALQ-92 communications jammer which is used aboard the Navy's EA-6B aircraft.

The AN/TLQ-15 ECM set is able to be used in a truck, ship, or aircraft or may be used at a fixed location. Operating between 1.5 and 20 MHz, this set has a "look-through" transmission feature (90% transmit and 10% receive), which permits checking the frequency being jammed. The unit puts out 2 kW, but when used with a gain antenna array, the effective radiated power can be increased to 8 kW in one direction.

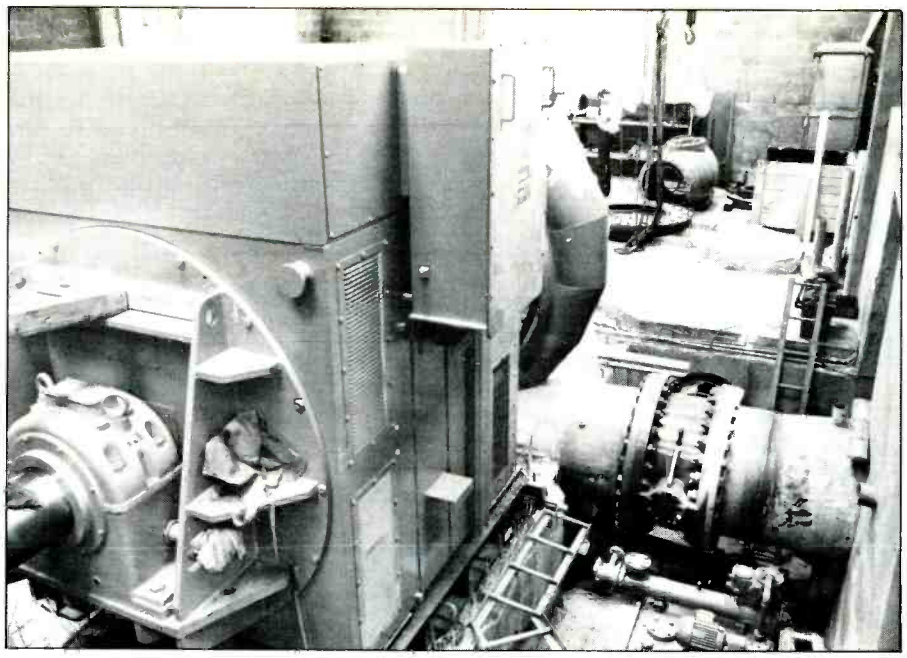
The Model 6040 Universal Jammer is made by American Electronics Laboratories and used for testing the jamming vulnerability of various systems. Some 33 different operational modes may be selected to produce a wide variety of jamming signals.

Fairchild Weston Systems Inc. produces three ECM payload packages, including a communications com-jam repeater, a homer, and a radar jammer. The com-jam repeater operates in the VHF spectrum, while the radar jammer operates in the S-band (1.55 to 5.2 GHz).

The AEL communications and countermeasures set is deployed in an air conditioned shelter mounted on an M-101 trailer towed by an M-715 truck. This operates from 1.5 to 20 MHz and puts out 2 kW in various modes.

The Piranha Applique ECM System is made by Fairchild Weston Systems and consists of a transceiver, RF amplifier, antenna, and spectrum analyzer. The unit, which can be installed in a Jeep, can intercept and disrupt the enemy's VHF communications. It puts out 1 kW (ERP).

With ECM so integrated into the weapons and tactical systems of modern military forces, it will be interesting to watch how it continues to develop and evolve as new technologies and techniques come to pass.



Part of the new HCJB power plant.

Goliath Of The Andes

BY GERRY L. DEXTER

One of the world's most unusual radio stations is also the one many shortwave listeners tune as one of their first loggings. This station is HCJB, The Voice of the Andes in Quito, Ecuador.

While religious broadcasters are not uncommon on the shortwave bands, HCJB is—for it was the first, the most successful. If it wished to, HCJB could probably make some sort of claim to having the largest non-government, non-network broadcasting complex in the world!

HCJB began in the mind of Clarence W. Jones, a musician, craftsman, songwriter, poet who got involved in evangelism at an early age and soon became fascinated with the new medium of radio and what it might be able to do to spread the word of Christianity. Soon Jones was involved in producing religious programs on Chicago's first station, WHT, back in 1922; eventually he became quite an expert in all phases of broadcasting, going on to produce programs for the CBS Radio Network.

But Jones felt the call to "arise and go south with radio." He explored possibilities in Colombia, Venezuela, and Panama without success or even any encouragement.

Just as he was beginning to question his mission, he met Dick Larson, an evangelist working in Ecuador who had enjoyed remarkable success with the Indians and had good rapport with the Ecuadorian government. Larson was enthused about Jones' idea and together they went to work. Larson went back to Ecuador, attempting to secure a location and a broadcasting license, while Jones stayed in the United States trying to generate interest, equipment, and money.

All the experts of the time scoffed at the idea of broadcasting from Ecuador. That was the worst place in the world to put a radio station, they said; right on the equator, in a high altitude, and full of mineral deposits which would absorb the signal!

Larson and Jones held to their convictions and Larson was able to secure a license from the Ecuadorian government.

Finally, on Christmas Day, 1931, HCJB went on the air with a 200 watt transmitter in a small shack on some property Larson had acquired. The sole studio was in Jones' house nearby. Telephone poles supported a longwire antenna. At the time of that first transmission, there were thirteen radios in all of Ecuador!

But the response was immediate and

The Spanish program staff works on some of the correspondence.

Recording a musical selection in Control Room Three.

HCJB INTERNATIONAL BROADCASTS

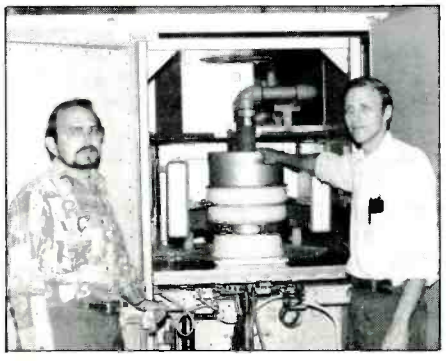
UTC	Language	Target Area	Frequency kHz
0000-0030	German	S. America	15175
0030-0130	English	N/S America	15175
0030-0200	English	N. America	17885
0030-0500	English	N. America	15155
0030-0700	English	N. America	9745
0130-0200	French	N. America	15295, 11810
0130-0230	Spanish	N/S America	15175
0200-0500	Spanish	N. America	6050
0230-0400	Russian	Europe	11810, 9515
0230-0430	Russian	Europe	11835a
0400-0430	Romanian	Europe	11810, 9515
0430-0500	Romanian	Europe	11835b
0430-0530	Russian	Europe	11810, 9515
0500-0600	Nordic	Europe	11835b
0500-0700	English	N. America	11915, 6095
0530-0600	Czech	Europe	11810, 9515
0600-0630	German	Europe	11835c, 9720
0630-0700	French	Europe	11810, 9720
0630-0700	Nordic	Europe	11835a
0700-0830	English	Europe	11835d, 9720
0700-1030	English	S. Pacific	9745
0700-1100	English	S. Pacific	11925, 6130
0900-0930	Quechua	S. America	9720, 6070
0930-1000	German	S. America	9720, 6070
1000-1030	Portuguese	S. America	9720, 6070
1030-1100	Quechua	S. America	9720, 6070
1030-1200	Spanish	S. America	11910
1030-1315	Spanish	N/S America	15395
1030-1530	Spanish	S. America	9765
1100-1130	Russian	S. Pacific	11925, 6130
1130-1200	Japanese	Japan	9715, 6075
1200-1530	Spanish	N. America	11910
1200-1530	English	N/S America	17890, 15115
1200-1430	English	N. America	11740
1530-2145	Spanish	N/S America	17890, 15160
1800-1830	Czech	Europe	21480, 17825
1830-1900	German	Europe	21480, 17825
1900-2000	English	Europe	21480, 17825
2000-2030	Nordic	Europe	21480, 17825
2030-2100	French	Europe	15295
2100-2130	German	Europe	21480, 15295
2100-2130	Nordic	Europe	17825
2130-2200	English	Europe	21480, 17825, 15295
2200-0030	Quechua	S. America	11900, 9745
2200-2230	Spanish	Europe	21480, 15295
2200-2300	Japanese	S. America	17745, 15295
2230-2300	Russian	S. America	15175
2245-0500	Spanish	N/S America	11960
2300-0130	Portuguese	S. America	17745, 15295
2300-2330	German	S. America	15175

a Sats & Suns only
b not Sats & Suns
c weekdays until 0645

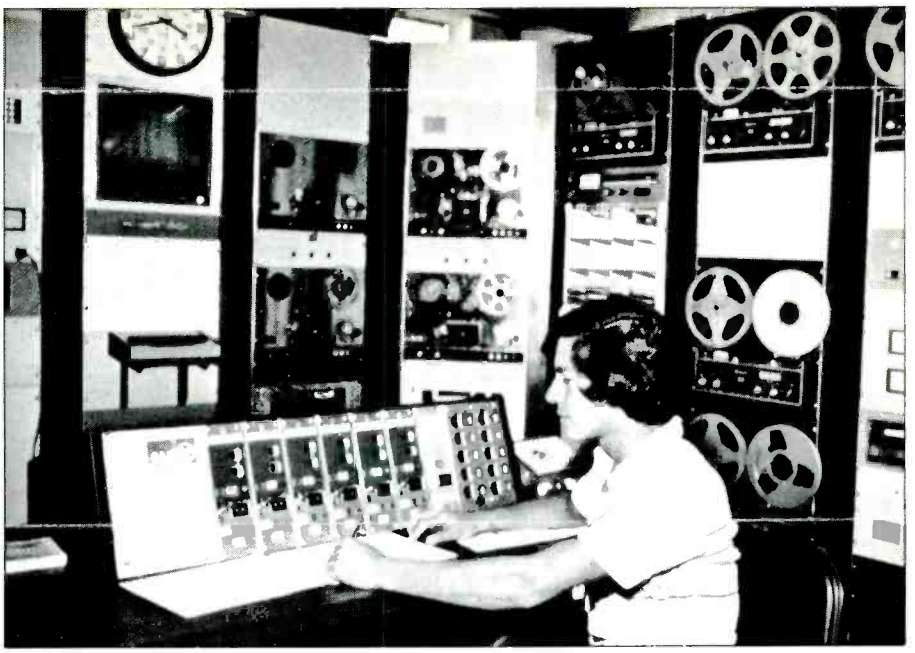
HCJB, Box 691
Quito, Ecuador

HCJB's 'round the clock schedule.

Helen and Clayton Howard, hosts of the popular "DX Party Line" show.



HCJB Engineering Director Don Spragg (left) and transmitter engineer Dick Riggs with 500 kilowatt output tube.



Program Control Center at HCJB.

overwhelmingly favorable. Regular broadcasting began and soon programs in the Quechua were added to those in Spanish and English. Time was made available to the Ecuadorian government (part of the licensing agreement for HCJB); broadcasts from the university and from the Ecuadorian congress were aired.

It was a touch and go existence with a thousand details to be done every day and mostly Jones to do them. The depression of the 1930's nearly brought it all to an end since money was in short supply. Operations were often on a day to day basis with no idea whether there would be enough funds to continue another month, another week, or sometimes even tomorrow.

From the very beginning, Jones established policies that demanded excellence in programming; non-interference in Ecuadorian politics; concern and involvement in local activities; and helping the Ecuadorian people whenever, wherever, and however possible.

"Radio Rodante" was an ancient truck that was converted into a mobile public address vehicle and made countless trips around the country promoting Christianity, learning, health, and HCJB with speeches and music—much of it live.

By 1937, HCJB had a 250 watt transmitter for local service and a one kilowatt outlet on shortwave. And by 1940, the one kilowatt unit had been replaced by a ten thousand watt transmitter vastly improving HCJB's signal in all parts of the world.

To increase the number of listeners in Ecuador, HCJB began supplying radios, many of them pre-tuned sets built by HCJB and distributing these in communities throughout Ecuador.

During World War II, HCJB joined with the NBC Radio Network as "The Voice of Democracy," helping to air programs and messages designed to combat the Nazis who were busy propagandizing South America. In gratitude, NBC later provided HCJB with a new studio building. Swedish, Russian, German, French, Portuguese, Yiddish, Italian, Dutch, and Slavic languages were added during the war years.

By 1945, HCJB had 15 missionaries on its staff working with 60 Ecuadorians.

In the mid 1940's, an FM station was added which today broadcasts in stereo to the Quito area. Transmitters were located on a city block in a suburb of Quito purchased in 1939. In the early 1950's, 100 acres of land were purchased some 20 miles from Quito (at Pifo) where most of the transmitters are now located.

At one point, HCJB did a live broadcast from a Pan American Airways plane in flight over Quito to celebrate the airline's twenty thousandth flight over the equator!

HCJB got into television broadcasting in 1961, on Channel 4, Ecuador's first TV station. Eventually, ownership of the station was turned over to a private, commercial company, but HCJB receives time on the station and produces several hours of TV programming each week from its C.W. Jones Television Center.

HCJB is involved in much more than broadcasting. In the late 1940's, Jones decided there should be a small medical staff available for use by the station's personnel, but primarily to serve the people of Ecuador. So, a small medical unit was brought in. It's first job turned out to be caring for the injured in the earthquake of 1949!

Like the radio, the medical operation grew and grew, until today, HCJB operates the Hospital Vozandes at Shell, The Rimmer Memorial Hospital in Quito, an Indian Hostel Clinic, and a Community Development Division. The latter originally provided wells, pumps, hygiene information, food projects, and the like but today serves more in the area of supervising and providing continuing education.

The Evangelism Department maintains

an automatic telephone answering unit with a recorded religious message that takes 32,000 calls per year, as well as a film library and a bookstore in Quito. It maintains a considerable staff to follow up to those expressing an interest in Christianity when they write to HCJB.

The station also operates the "Bible Institute of the Air," originally created to produce Bible lessons and training in Spanish and provide correspondence courses for those who can't attend a formal Bible school or seminary.

HCJB's Music Department maintains a library of 6,000 long playing records and thousands of audio tapes. Each language department has their own music library. The department also works to develop local musical talent and staff musicians produce their own recordings for on the air use. The station operates its own print shop as well.

Clarence Jones retired from HCJB in 1958 and began devoting time to a new group, International Christian Broadcasters, aimed at helping set up religious radio stations. An outgrowth of this work is today's progress in Italy, where HCJB is working to provide high quality programming to that country's religious broadcasters and working to set new stations on the air, including on shortwave.

Going back to 1931 when HCJB was born, so was the "World Radio Missionary Fellowship," the organization set up to operate HCJB and all its divisions. The word "world" in the organizations' name brought sneers from people at the time when they were told that the station's power was 200 watts!

HCJB's call letters were chosen carefully and, unlike what you might think, the Spanish version was selected first—Hoy Cristo Jesus Bendice (Today Jesus Christ Blesses) and "Heralding Christ Jesus Blessings" following. Jones and Larson, with several others, tagged the "JB" onto the Ecuador "HC" prefix and added the meanings as they sat around in an early version of what today we'd call brainstorming.

HCJB has a sister station in Panama—HOXO, The Voice of the Isthmus—which came on the air in 1949 and added an FM outlet in 1971. DXers may lament the fact that HOXO has no shortwave outlet.

HCJB's Alex Kuushinikov presents a program in Russian.

In addition, The World Radio Missionary Fellowship operates broadcast band stations KVMV, McAllen; KBNR, Brownsville; and KOIR, Edinburg, all in Texas.

HCJB and WRMF have offices in Florida (at P.O. Box 3000, Opa Locka, Florida, 33055). There are also offices in Canada, Australia, Denmark, England, Finland, France, Holland, Italy, Jamaica, New Zealand, Norway, Sweden, Switzerland, and West Germany!

HCJB wasn't very old when Jones realized there would eventually be a problem in providing electrical power to operate additional transmitters. So, in 1955, construction was begun on a giant dam and power plant at Papallacta, which came "on line" ten years later. Still another power plant should be completed at any time which will supply four million watts of power to Ecuador and HCJB.

Programming on The Voice of the Andes today amounts to 500 hours per week in 14 different languages and draws some 8,500 letters a month. There are 10½ hours per week in Japanese, 17½ hours in Spanish daily on the Quito medium wave station (which enjoys a number four rating in Quito), 18 hours per day on stereo FM, and nearly 24 hours per day on shortwave in Spanish. German runs 3 hours daily and the Nordic languages some 14 hours per week.

HCJB's transmitter complex at Pifo features four - 100 kilowatt units, two - 10 kilowatt transmitters, two of 30 kilowatts, two of 50 kilowatts, and one - 500 kw. All but two of these were built by HCJB's engineering staff. There is also a 25 kilowatt medium wave standby transmitter at Pifo.

At Mt. Pichincha, there's a 50 kilowatt medium wave transmitter and a 5 kilowatt stereo FM. There's also an HCJB station in Guayaquil.

Pifo has 26 shortwave antennas, including 18 curtain arrays, two reversible cardioid arrays, two dipoles, two lazy H antennas, and a steerable beam reflector antenna and a 24 element quad. HCJB engineers developed the world's first cubical quad antenna that could be turned in any direction.

In Quito, five studio-control room combinations are linked to the transmitter site by high frequency radio. Four hundred phone lines serve the studios and offices!

Two of HCJB's frequencies may be of special interest to DXers; 3.220 which carries the Quechua language program can help one get a "feel" for that tongue, and 26.020 where, as something of a hobby, the engineers maintain a 100 watt transmitter on the air 24 hours a day. With the current high sunspot count, the little 100 watt whistle has been heard around the world. One wonders if perhaps the engineers may think that things have come full circle.

HCJB operates a club for DXers called Andex International and membership information can be obtained by writing to the club in care of HCJB.

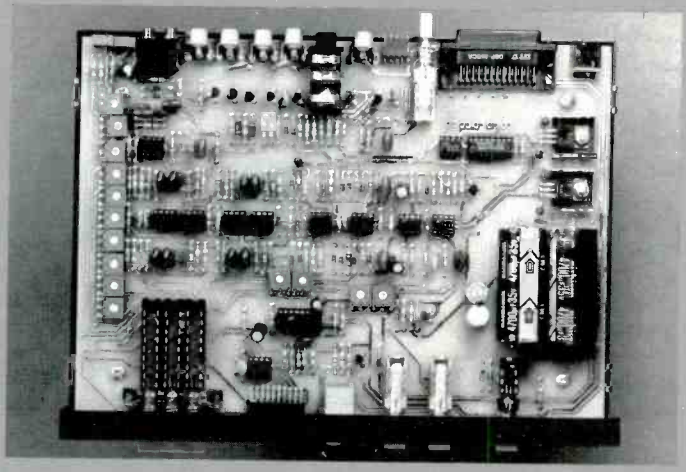
The station also conducts tours of its facilities as part of station-sponsored tours of Ecuador. Information on the tours can be had by writing to HCJB at the Opa Locka address mentioned earlier.

Should you have an interest in going to work at HCJB, they'll be glad to give you consideration and more information. You should write to Edwin E. Giesbrecht, World Radio Missionary Fellowship Inc. at the Opa Locka address.

Fully verified HCJB QSLs are obtainable when your reception report includes the date, the time in GMT, the frequency in kilohertz, the name of the program(s) to which you were listeneing, and at least 15 minutes of listening time. For an airmail reply in the Americas, include fifty cents in mint stamps, seventy cents worth if you should be outside the Americas. HCJB's address is Casilla 691, Quito, Ecuador.

Two years ago, HCJB celebrated its fiftieth anniversary. It's become much more than a pioneering radio station, more than a religious broadcasting goliath, and more than a servant of the Ecuadorian people. It's become an institution.

CHAMPAGNE RTTY/CW on a Beer Budget



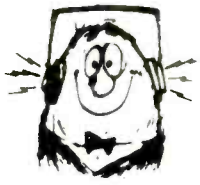
CP-1 Computer Patch™ Interface

The AEA Model CP-1 Computer Patch™ interface will let you discover the fastest growing segment of Amateur Radio: computerized RTTY and CW operation.

When used with the appropriate software package (see your dealer), the CP-1 will patch most of the popular personal computers to your transceiver for a complete full-feature RTTY/CW station. No computer programming skills are necessary. The CP-1 was designed with the RTTY neophyte in mind, but its sophisticated circuitry and features will appeal to the most experienced RTTY operator.

The CP-1 offers variable shift capability in addition to fixed 170 Hz dual channel filtering. Auto threshold plus pre and post limiter filters allow for good copy under fading and weak signal conditions.

Transmitter AFSK tones are generated by a clean, stable function generator. Plus (+) and minus (-) output jacks are also provided for CW keying of your transmitter. An optional low cost RS-232 port is also available. The CP-1 is powered with 16 VAC which is supplied by a 117 VAC wall adaptor included with the CP-1.



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CIRCLE 29 ON READER SERVICE CARD

Secrets Of Scramblers

BY LEE LAPIN

There is one other approach to the private conversation problem; a scrambler.

The first drawback is that with any scrambled transmission system, all parties must be equipped with an operating scrambler in order to understand the conversation.

In any audio security system, one has to accept some sort of compromise between security, overall performance, and price. Some systems are too complex to be utilized in some applications. Generally, the more secure a system is, the more likely the audio is to be degraded, possibly to the point of uselessness . . .

The most secure "scramble" system is actually not a scrambler at all; it is the cipher. In any cipher system, the analog audio is broken down into digital "bits" by a random time sampling method.

This system is similar to the method by which state-of-the-art musical recordings are made in top recording studios. A high number of bits are sampled from each second of audio (enough so the human ear would hear it as analog audio); then the bits can be electronically manipulated to do damn near anything the recording engineers want them to do . . .

In our cipher system, each small time element is given a bit number which represents its amplitude and polarity. These bits can then be rearranged into any order the user wishes.

This function is usually controlled by a code set in by the operator.

In order for the speech to be understandable, one would need to employ at least 6 kHz (for a 3 kHz voice bandwidth). This would necessitate 24,000 bits be sent each second (a minimum of 8 positive and 8 negative levels requires a 4 bit number).

The telephone simply will not transmit a high enough number of bits for this system to be effective without the use of a very costly compression device called a Vocoder.

However, our cipher system can be operated on a wideband channel in radios or other types of transmitters.

Ciphers can easily achieve a high enough code possibility rate that it would require years or even hundreds of years of computer time to break them . . .

Scramblers are much more widely employed, as they require no special treatment with regards to bandwidth. A scrambler's level of security depends both on the method employed for scrambling as well as the number of codes (or programs, keys) utilized.

Speech scrambling is based on one or more methods which rearrange the normal information parameters inherent in coherent audio. These parameters can be a combination of frequency or time.

This portable security communications suit case is produced by CCS Communications Control, Inc. It includes a sophisticated voice scrambler.

In the simplest scramblers, this rearrangement is static in nature. It follows the same pattern of confusion each time. Better scramblers use a dynamic method which constantly varies the order of confusion according to a predetermined code.

In a dynamic scrambling system, all scramblers must use the same code at the same time.

Types Of Scrambling

1. Inverters. This is the oldest and simplest form of scrambling. It is also the one most widely used . . . In this case, the high frequency portion of the spectrum is switched with the low end.

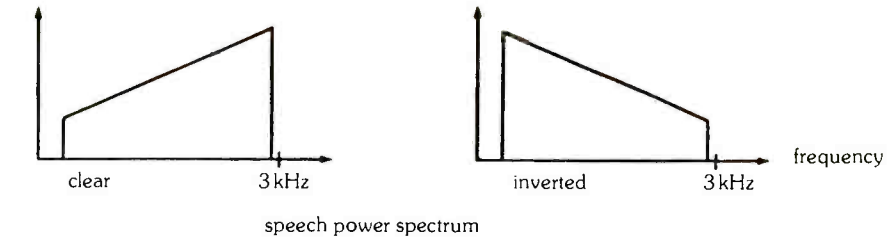
2. Bandshift Inverter. The next step up the scrambling level; the audio is first inverted (above) and then the entire spectrum moved along the frequency axis by a certain distance. Anything extending above the new frequency limit is chopped off and reattached at the low end . . .

Normally, BI units use between 4 and 16 different values for their "X" factor.

3. Bandsplitter-Inverter. In this method, the audio band is divided into 4 or 5 subbands which are then shifted about with abandon. To further complicate things, some of the bands are inverted.

Bandsplitter-Inversion requires several (one for each sub-band) bandpass filters, as well as several modulators. It is a more expensive system and lacks the audio quality of the simpler systems in the demodulated signal.

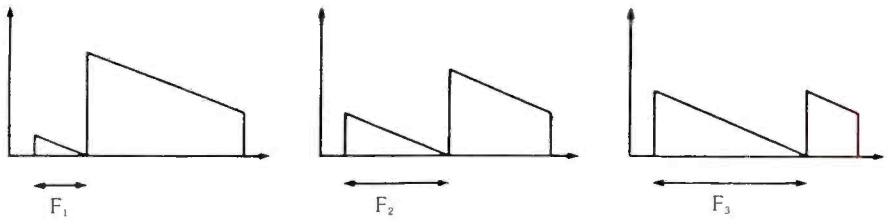
4. Cyclical-Bandshift-Inverter. This is a dynamic bandsplitter inverter that fol-



speech power spectrum

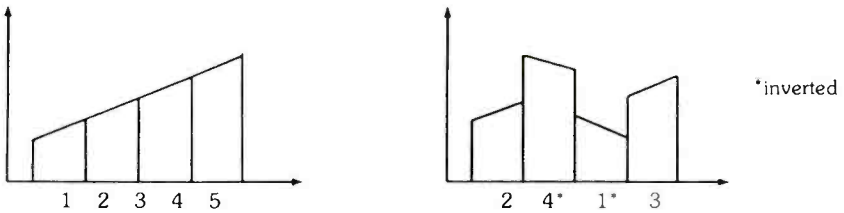
Bandshift-Inverter

with only 3 values for F



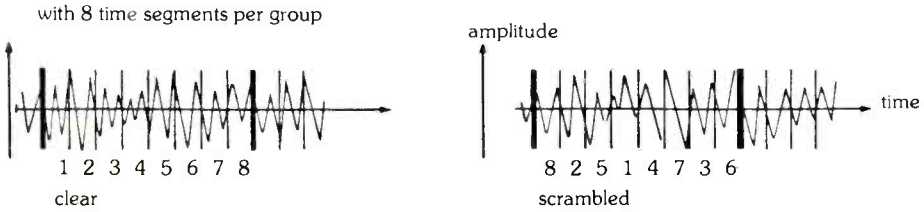
Bandsplitter-Inverter

with 4 subbands



Time Division

with 8 time segments per group



lows a pre-set code to shift the order every 10 or 20 milliseconds.

5. Frequency Hopping-Inverter. A dynamic system similar to Cyclical system except it has a jumping inversion frequency.

6. Rolling Code Bandsplitter. A dynamic bandsplitter wherein the frequency sub-bands are rearranged X number of times per second according to a set code.

7. Masking. This simply means to interject noise, either coherent or random, into the audio in order to mask the intelligence. The noise is filtered out at the other end.

Masking is not very effective alone, but does serve to help muddy the waters when combined with one of the other systems.

8. Time Division. This system bears some resemblance to a cipher in that the audio is sliced into small time segments which are then shifted in position. Since any segment, including the last, may be transmitted first, the entire signal demodulation has to be delayed for the duration of each group. A very good system except for the induced delay, and the higher the security, the longer the delay.

9. Special Time Division. These types of systems do not actually rearrange the slices, but may mask them with multiple echoes or other tricks so there is no delay.

10. Time Division/Frequency Division. If a system uses frequency division along with time division, the delay can be overcome without loss of security.

Remember that a telephone is a full duplex, two wire system, i.e., both parties can talk and listen at the same time.

Transceivers and other radio systems are half duplex; you must push-to-talk and only one operation can be done at once.

Most scramblers are half duplex, although full duplex models are available, *but these require a four wire channel to operate correctly!* The best compromise is a VOX (voice operated) half duplex scrambler. Most of the time, the user(s) will not even notice it is not a full duplex system . . .

Choosing And Using A Scrambler

Generally, the best unit you can afford should be used, *except* you should take into consideration the fact that rolling code type units (dynamic) tend to get harder to use and more unreliable as distance and noise increase.

Once you have a scrambler, you can raise its security level by a great degree by simply couching your speech in personal double-talk with anyone you know well enough to equip with a scrambler. You can come up with ways to say what is necessary so that a third party would have trouble understanding the intent, even if he could understand the conversation.

Attacking A Scrambled Conversation

Remember, *no* scrambler conversation is 100% safe (except a good cipher). Any other code can be broken with the correct equipment and time to use it . . .

Many of the simpler systems leave a fair amount of residual intelligibility in the audio. Often, a variable speed tape recorder can be used to understand much of a scrambled conversation by simply playing and replaying it at various speeds.

The next step is to employ some variable filters to re-shape the sounds. These units can be purchased at reasonable cost from Alternative Technologies, Viking International, and Wynn Engineering.

For another small outlay, you can buy an inversion demod unit that will hook up to a radio, scanner, or sometimes to a recorder or telephone. These unscramblers have an adjustable inversion filter and will do a good job on most simpler scramble jobs.

Remember, even a cheap scrambler may cost $200-$500 per unit and each unit in the system needs one. This means most agencies (police, some feds, public safety, etc.) use an inexpensive system.

A ready-to-go unscrambler is available from: Capri Electronics, Rt. 1, Canon, GA 30520; Information Unlimited, Box 716, Amherst, NH 03031; and DNE, Inc., Rt. 7, Box 257, Hot Springs, AR 70901.

Even if a higher security method is to be challenged, the combination of filters, variable speed recorder, and an inversion unit will often give you enough of the conversation to understand what is going on . . .

Industrial spies and the like have another approach to understanding scrambled information; they simply bug the room and intercept it before it is processed . . .

How The Russians Eavesdropped On Our Embassy

Here's The Secret "Bug" The Soviets Used To Spy On Our Diplomats

BY TOM KNEITEL, K2AES, Editor

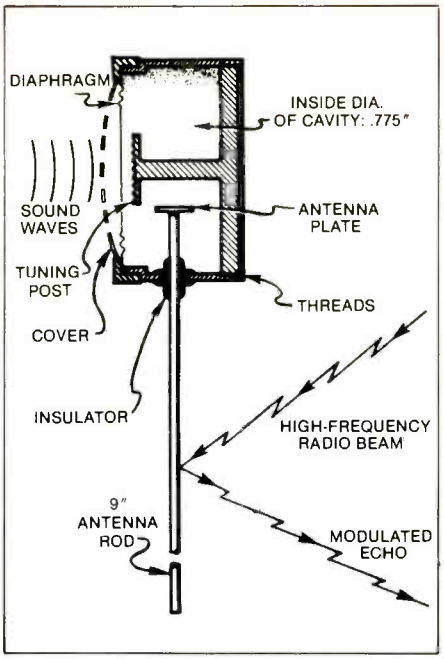


Diagram of the bug shows how capacitive changes in the cavity alters the charge on the antenna, which modulates the radio beam.

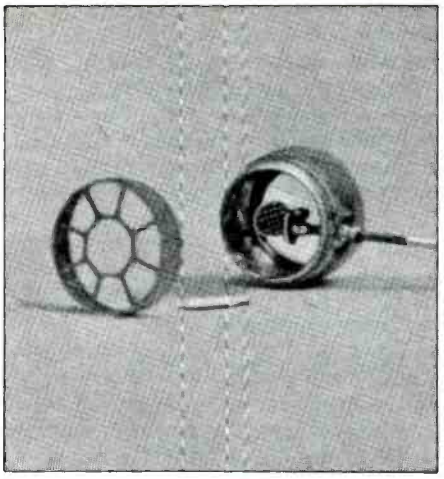
On May 26, 1960, American Ambassador Henry Cabot Lodge shocked the United Nations by exhibiting a miniature room bug that had been discovered in the U.S. Embassy in Moscow. It was the dramatic high point of several years of cold war suspicions between eastern and western bloc nations, wherein each kept accusing the other of spying upon their respective diplomatic corps.

The bug that Lodge displayed to the United Nations had been secreted in the Great Seal, which had been hanging over the ambassador's desk and was a gift from the Soviets. As Lodge revealed his tale of intrigue, it turned out that the U.S. had discovered the listening device in 1952, but didn't reveal its existence for some eight years. During those eight years, our government decided to conduct exhaustive investigations within other embassies, missions, and consulates maintained in other nations. This search turned up about 130 additional secret eavesdropping gizmos, but none gave quite the same emotional shock as that first one discovered in Moscow, and none were as cleverly designed as the Moscow bug.

The Moscow Bug

The eavesdropping device shown by Lodge consisted of a cylinder about as big around as a quarter and measuring 11/16" from front to back. A nine inch rod protruded from one side and on the front of the cylinder is a perforated cover incorporating a diaphragm. In operation, the bug was hidden within a cavity between the front and back sections of the Great Seal (which was made of maple). Just below the beak of the eagle, there were several tiny holes drilled to coincide with the location of the diaphragm; these holes let in the sound waves.

Though by today's standards this bug was somewhat large and cumbersome, it performed the same task and operated with the identical theory of operation. The purpose of a room bug is to convert acoustical energy into electrical energy so that the information (speech) can be sent via wire or radio signal to a listening post. The Great Seal device used the radio method in a manner so simple that it amazed technicians of the day. It had no circuit (as such), and since the Soviets wouldn't be able to continually change



Visible in the closeup of the cavity are the tuning post in the center and the antenna plate. The threaded cover holds the diaphragm. A quarter lies on the table.

May 26, 1960: In the United Nations, U.S. Ambassador Henry Cabot Lodge shows the listening device the Russians planted in the Great Seal they gave our Moscow Embassy.

the unit's batteries in order to keep it going, it had to be designed without any power source! In the 1950's, that was a pretty tall order!

A Detailed Look

The Moscow bug, which was constructed of copper that had been silver plated, was hollowed out inside to such close tolerances that it created a sharply tuned (so-called "high-Q") cavity. The State Department's Intelligence Service had estimated the Q factor to be as high as 1,000.

Mounted on the rear of the cavity was an electrode (or tuning post) holding a quarter-inch wide flat plate parallel to the three-mil diaphragm. The tuning post's plate and the diaphragm were capacity coupled.

The nine inch antenna (a silver plated copper rod) passed through one wall of the cylinder and terminated in a small plate that was located near the tuning post. The post and antenna plate were also capacity coupled. The back cover was threaded for precise adjustment of cavity size.

In actual operation, the Soviets placed a transmitter with a directional antenna at some nearby spot. Out of that transmitter came a signal at about 1600 MHz. The antenna was probably a small dish type, like a radar dish, and the signal was also radar-like except that it wasn't pulsed.

The RF beam struck the bug's small antenna and a feeble signal echoed back. As long as the antenna kept the same electrical length, the echo would remain at the same frequency. It was devilishly clever!

Any person who spoke near the Great Seal generated sound waves that struck the bug's diaphragm, causing it to vibrate. This altered the cavity's size ever so slightly and varied the capacitive values of the device. The changes in the capacitances altered the charge on the antenna rod (radiated to it from the transmitter) and caused its echoed signal to vary accordingly. In effect, the bug modulated a small piece of the beamed signal before returning it as an echo. The echo was picked up by a receiver and demodulated to reproduce the sound of the original speech.

At the time, the State Department observed that the bug was especially difficult to detect because its power was controlled by the eavesdropper. They likened the device to the echo boxes that were once placed in front of radar units to tune them. The entire bug weighed just over one ounce and its cavity had an inductance of 1/100 microhenry.

In the years after the Moscow bug was discovered, it was put through many tests by electronics experts. They reported that it worked well in free space but was extremely sensitive to its environment. It must have given the Soviets fits once in a while because its operation was so critical, it went haywire when any small piece of metal (a nail, a wristwatch, a tie-clip, even a pair of shoes) was placed near it.

Today, bugs have gotten smaller and smaller and the techniques for using them have become so highly sophisticated, they

The Viking International pocket transmitter detector WFM 140 warns its user of the presence of "bugs" by means of a red LED or a built-in, silent vibrating unit. It measures 2¼" × ⅞" × 3½ and can easily be carried in a shirt or coatpocket. The sensitivity is continuously adjustable and an output is provided for a remote light (supplied), and the frequency range is from 30 to 1000 MHz.

Tricky, Those Russians

The Government's security experts are becoming more concerned over the development of listening devices by the Soviet and other intelligence services.

President Kennedy was warned before his departure that the only safe place to talk was outdoors. It seems that the Russians have developed a gadget that even picks up sound waves off a window pane. Thus they could intercept a talk between the President and his advisers in the United States Embassy in Paris or Vienna.

Even consultation outdoors is becoming tricky because of the perfection of long-distance directional microphones.

New York Times item indicates worry about bugging during President Kennedy's '61 trip to Europe.

make the Moscow bug look extremely primitive. Our foreign buildings are still vulnerable to being bugged because they are built by local workmen who can easily salt the whole structure with listening devices which could take years to unearth, especially those that lie dormant until triggered into action upon receipt of a command signal.

Of course, our methods of detecting bugs or taking countermeasures against the effectiveness of those we haven't located have also come a long way in the last 30 years! The most basic countermeasure against a room bug is setting up a barrage of noise which will confound the listening device while a conversation is taking place. This could consist of a radio or tape machine playing, the sound of running water, or an electric fan. Even though a clever professional eavesdropper can eventually figure out how to filter such "drown out" noises from his bug, there may be considerable difficulty in getting "good copy." The best masking method is to drown out the bug with a radio or TV playing a talk program, so if the eavesdropper tries to filter out the frequencies of the masking sounds he'll have to also filter out the voices in the conversation he wants to hear!

Another method used to foil undiscovered room bugs includes attaching vibrators or buzzers to the walls of a room. An illegal method (although perhaps no less legal than the bug itself) would include establishing a "hash" transmitter, a broad-band RF device that sends out a signal over a wide range of frequencies in order to jam bugging receivers. The problem with this is that it will cause interference to the radios and TVs of everybody having the misfortune of being located anywhere near the "hash" transmitter!

One current method of bugging a room is, in many ways, a refinement of the 1952 Soviet idea. This system bounces a laser beam at a window pane. Sound from within the room in which the window is located vibrates the window sufficiently to cause the laser beam's reflected beam to become modulated so that the conversation can be retrieved.

The only effective way of avoiding undiscovered room bugs is to avoid talking about anything you don't want overheard—or at least using a pad and pencil to write it out!

EQUIPMENT REVIEW:

The MAG Electronic Polarizer For Satellite TV Reception

BY MARK LONG, WA4LXC

The electromagnetic spectrum which encompasses the entire range of communications frequencies from audio, radio, and TV to microwave, visible light, and beyond, is a precious resource. Some of the most technologically rewarding developments in communications center around refinements in transmission techniques, which allow more signals to be contained within a finite frequency space. The current use of the 3.7 to 4.2 GHz frequency band for satellite-to-earth communications provides an example of how the simultaneous re-use of the spectrum can expand our limited resources.

The second generation of domestic communications satellites now in use have doubled the number of video channels over what their predecessors were able to provide. Each new satellite can now deliver a total of 24 transponders within a 500 MHz wide band which could previously only accomodate a maximum of 12. This has been accomplished through the dual polarization of the satellite signals themselves. Twelve transponders or channels are polarized vertically, while an additional twelve channels are horizontally polarized.

Although the transponders of opposite polarity overlap one another, they will not interfere with each other: the earth station's low noise amplifier (LNA) can be maneuvered to "see" only a single polarity at a time. Initially, private home TVRO systems used a regular TV antenna rotator to mechanically position the LNA so that its pick-up probe would be oriented in either a relatively straight-up-and-down (vertical) or lying flat (horizontal) position. While this method worked, it took several seconds for the rotator to move from one polarity alignment to the other. This method also put unnecessary strain on the coaxial and power connections to the LNA, which were moved to and fro each time the polarity was changed. Eventually, the connections would short out, or moisture would enter through stress-created cracks in the sealing compound which surrounded the microwave cable connections. In either case, intermittent or even permanent loss of the video signal could eventually occur.

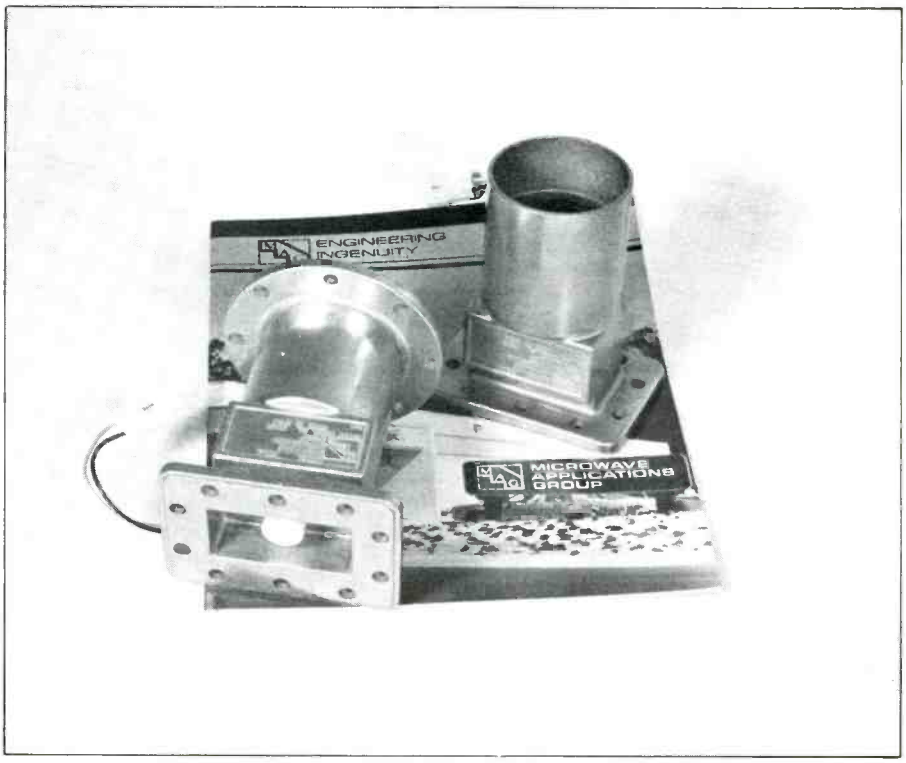


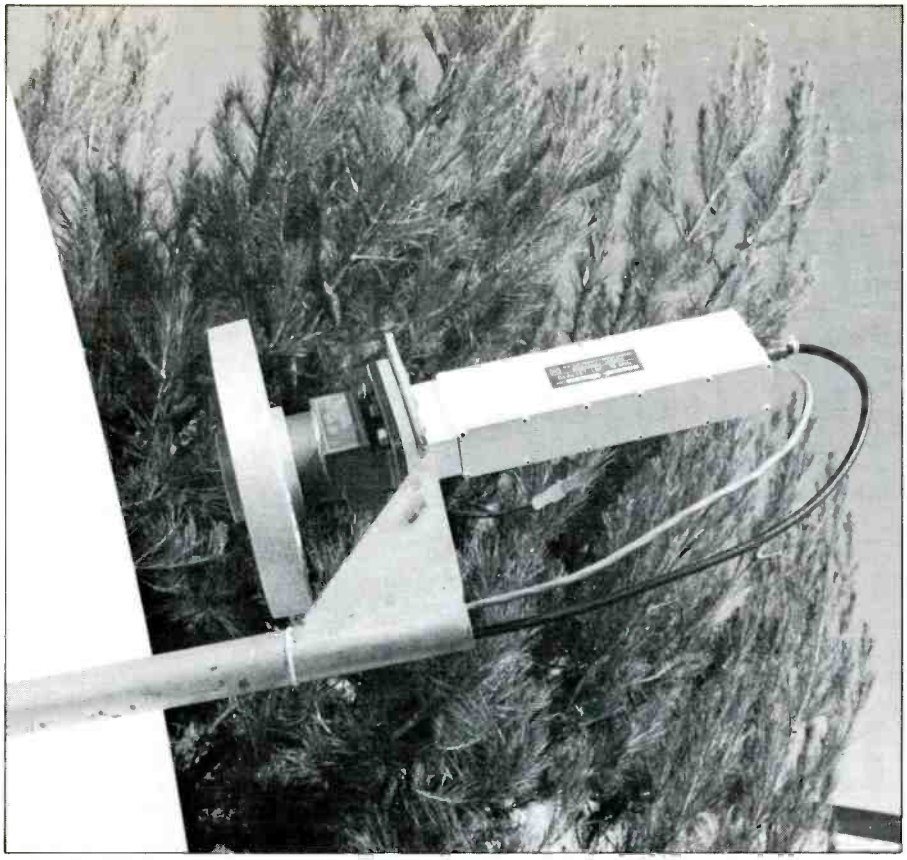
Photo courtesy Microwave Applications Group.

Today it is possible for satellite TV newcomers to purchase an electronic polarizer with their system which replaces the mechanical "chunker and clunker" of days past. Those owners with the old-time rotator can also retrofit their installation for instantaneous and silent electronic rotation. Rather than move the costly LNA about, the electronic polarizer electromagnetically alters the polarization of the incoming signal itself.

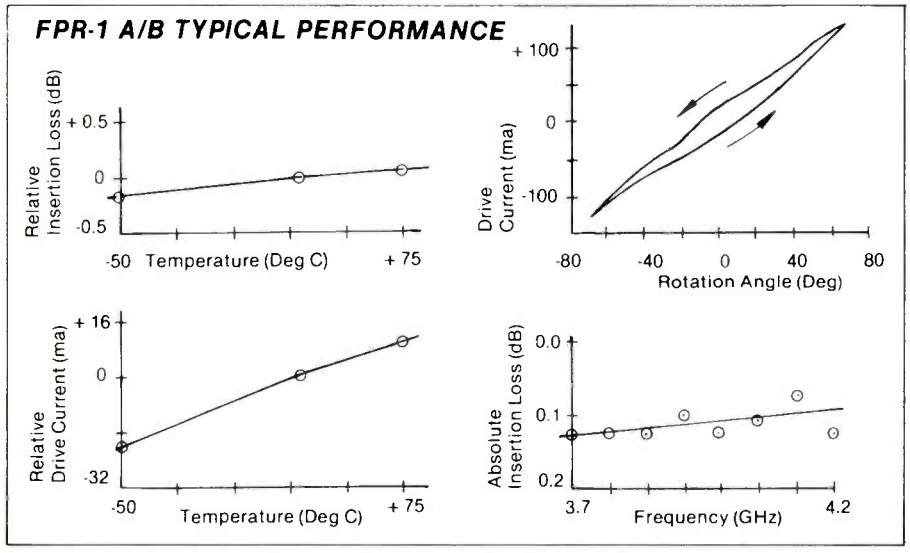
The Microwave Applications Group (MAG), located in Santa Barbara County, California, is a leading manufacturer of microwave products. No stranger to microwave technology, MAG has developed essential rotary-field phase control elements for the military's E-3A Airborne Warning and Control System (AWACS) radar planes. The company has also supplied items for use in early versions of the F-16 aircraft radar system and for the Electronically Agile Radar (EAR) antenna. It was only within the last couple of years that MAG stepped beyond the defense and aerospace markets to offer a new type of product to the satellite earth station industry.

The MAG FPR-1 Polarization Rotator provides a means of electronically selecting the polarization of signals received by satellite earth station equipment. It is designed to operate within the 3.7 to 4.2 GHz band with minimum losses in the received signal level. The MAG electronic polarizer makes use of a basic property of ferrites—compounds of oxygen, iron, and several other metals that are now playing an important role in the development of microwave communications.

In 1845, Michael Faraday discovered that the polarization of light waves could be rotated if they were first passed through a ferrite material that was energized by a magnetic field. This phenomenon is today known as



MAG FPR-1 with feed ring and LNC. Photo courtesy Microwave Applications Group.

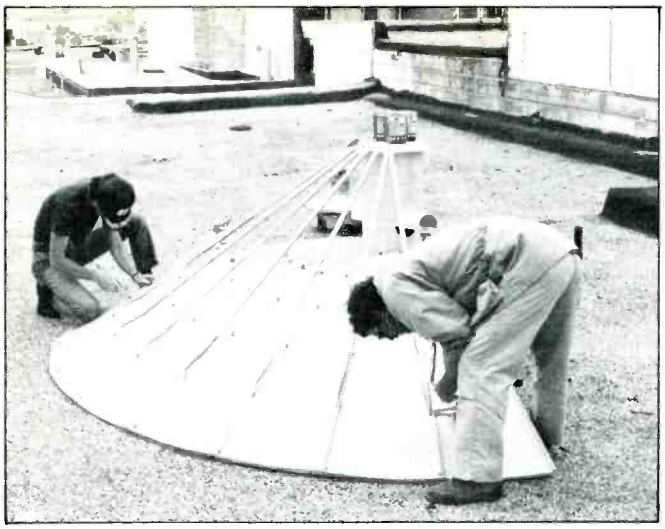


Courtesy Microwave Applications Group.

the "Faraday effect." We now know that microwaves, which are lower in frequency to light waves, are also similarly affected.

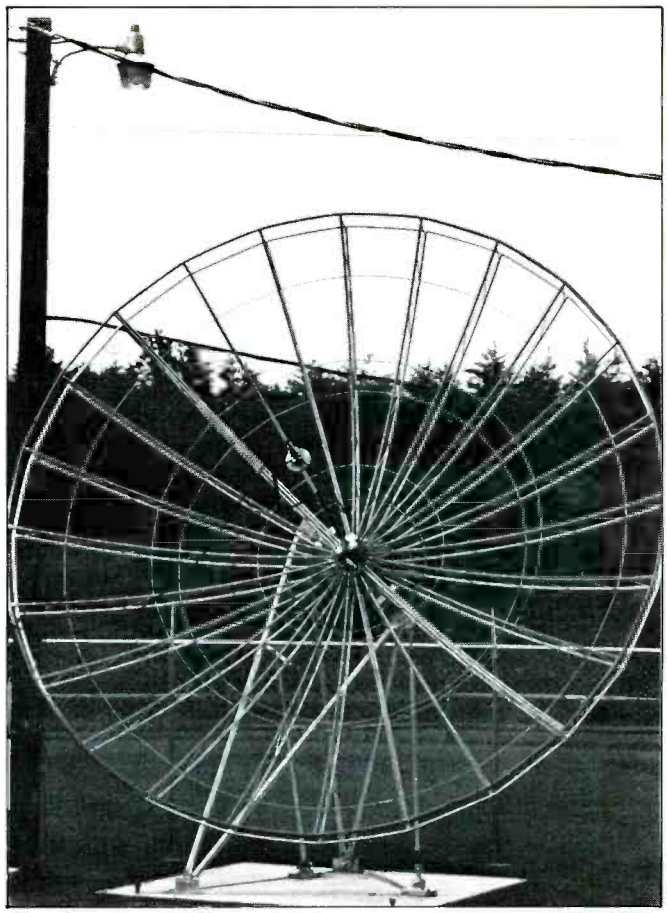
The signal from the satellite is reflected off of the dish and into the circular waveguide of the MAG Polarization Rotator. From there it passes through a ferrite rod. A coil of wire wraps around the outer perimeter of the ferrite rod; when energized, it generates the required magnetic field. The interaction between the incoming microwave signal and the spinning electrons within the ferrite can cause substantial changes in the phase of the incoming signal. The resulting change in signal polarity is determined by the electrical polarity of the energizing magnetic field.

The MAG Polarization Rotator is connected via a two wire cable to a bi-polar current source which supplies a plus or minus 0-100 ma of current to the MAG's energizing coil. In some cases, the receiver has been designed with the electronic polarizer's power supply built right into it. These receivers can directly hook to the MAG so that whenever the channel control is changed, the receiver automatically selects the correct polarity. The use of the MAG electronic polarizer not only simplifies home TVRO reception, but also greatly reduces the long-term maintenance of the system. With electronic polarization, the technology of home satellite reception can effectively make use of the effective frequency reuse brought about by the development of cross polarization.



The assembly of an aluminum petal dish. (Photo courtesy of Transvision)

Buying Your First Satellite Earth Station



A wire mesh parabolic antenna (Photo courtesy of Pilotview Corp.)

BY MARK LONG, WA4LXC

I am often asked by friends and acquaintances to recommend the best TVRO system for them. Unfortunately, there is no easy answer! The location of the site, environmental conditions, the personal likes and dislikes of the owner, and local zoning laws or town ordinances can all have a major impact on your decision. So rather than stick my neck out and recommend a particular manufacturer, I usually try to provide enough information so that the individual can assess the field of equipment available and make an intelligent decision on his own.

Choosing from among the myriad of electronics and hardware offered by today's TVRO industry is no easy task. One recent satellite trade show had over 184 antennas to choose from. Although there are not quite as many receivers available, there are so many options to consider that selection can be quite difficult. The following article touches upon some of the main aspects surrounding the selection of home TVRO equipment.

Selecting A Dish Antenna

Dishes can be constructed out of wire mesh, metal, or fiberglass. Although any of these materials can provide equivalent performance for a given size, some materials are more durable than others. If selecting a fiberglass dish, beware of low cost models. Fiberglass technology is still more an art than a science. I have seen even the best fiberglass dishes warp or crack after several years of exposure to the weather. The best fiberglass dishes are constructed of fiberglass reinforced plastic and are compression molded with a ribbing structure, which lends structural support to the dish.

Screen dishes can work well, but be sure that no bumps or waves are present in their surfaces. You can check for this by running your hand across the surface of the antenna. For the best performance, the parabolic curvature must accurately conform to the engineer's theoretical design.

Observe how the mesh or screen is attached to the support structure. Some antennas use hundreds of sheet metal screws or pop rivets to attach the screen to the dish's support struts, while others make use of a spot welding technique to ensure that the screen is well tacked to the frame. A few of the dishes use a metal fastener which resembles a paper clip to hold the screen onto its support members. This last method appears to me to be rather flimsy. Many manufacturers have streamlined the design of their mesh antennas by eliminating the use of sheet metal screws and pop rivets from the antenna assembly. Antenna petals which in the past were screwed into place now slide into grooves cut into the dish's support struts. From an engineering viewpoint, this is the best method being used today. Not only is it structurally sound and visually quite elegant, it also helps to reduce the ripples in the parabolic curvature.

Some attention should also be given to the kind of screen selected. The best screen dishes use a radar-type mesh which is fairly heavy duty. It should withstand long term exposure to the elements. Those antennas using light screen gauges resembling window screen should be avoided.

Mesh antennas have the least impact environmentally. Unlike solid antennas which can constrict your view, you can see through the mesh dish. Neighbors who might object to the obstruction created by a solid antenna may be able to live with a mesh one.

From a structural standpoint, the solid metal dish is probably the best overall choice. Not only is it impervious to warpage but it also can withstand damage from the elements better than most fiberglass or wire mesh models. Only a mean hailstorm can cause them damage; even then, any dents can usually be removed by the application of a rubber mallet.

Aluminum is the best metal for dish construction; usually a marine grade alloy is used, which is resistant to corrosion when installed near salt water. Steel dishes are also acceptable, although care should be taken to keep them painted or rusting can ensue after long-term exposure to the weather.

No matter what the material used, the

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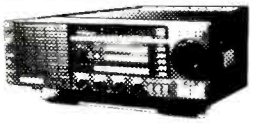

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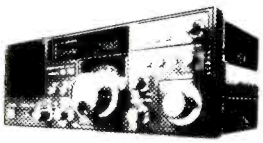

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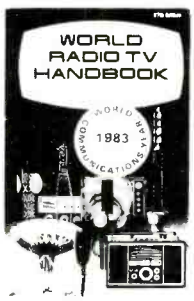

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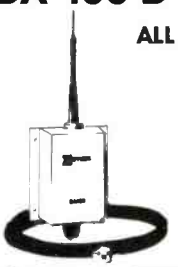

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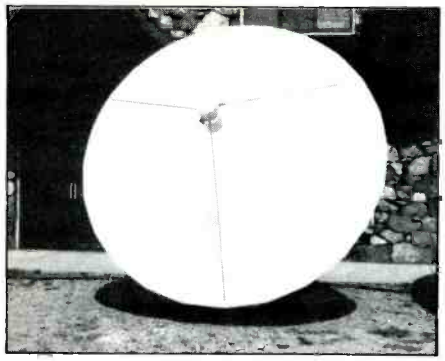
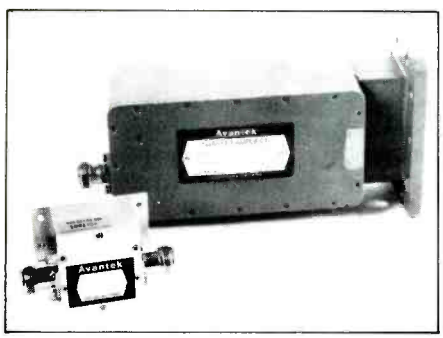


An aluminum petal dish with polar mounts. (Photo courtesy of Francis Electronics)

Mounted on a roof is a 10 foot wire mesh dish. (Photo courtesy of Microsat)

Birdview 20/20 TVRO Receiver. (Photo courtesy of Birdview)



GaAs FET Amplifier by Avantek. (Photo courtesy of Avantek)

one-piece dish is often the most faithful reproduction of the master mold's parabolic curvature. But it is a problem to ship. More often, multi-petal dishes are the norm, and if they are assembled with care can provide excellent reception. Some petal antennas have hundreds of bolts that must be tightened during assembly. If you are doing the installation yourself, you may want to opt for a design that is less troublesome.

More and more these days, we are seeing dish antennas which utilize a cassegrain feed for funneling the signal into the LNA. This differs from the prime focus feed which positions the LNA and feedhorn at the focal point of the dish. The cassegrain feed uses a small subreflecter (sometimes called a splashplate) at the focal point to bounce the signal down into the LNA which mounts behind the antenna at the center of the dish. TVRO engineers use cassegrain feeds to squeeze additional gain from a given antenna size. An efficiency approaching 70% is possible, as opposed to the 55% normally obtained by prime focus antennas.

At recent TVRO trade shows, several manufacturers have demonstrated satellite reception using antennas six feet in diameter or smaller. From locations within the central portion of the U.S., the quality of reception can be quite good on most transponders. Smaller systems can be practical for those of us living in limited space situations. But you should remember that these smaller systems have little margin for the future, when the traveling wave tube amplifiers onboard the spacecraft now in orbit start to weaken. As the satellites age, the power levels transmitted by them will be reduced by 1 or 2 dBs, which could place your receiver below threshold on many transponders. This will cause impulse noise or sparklies to invade the video on the weaker channels. Some manufacturers are selling 6 footers which can be expanded to a larger size at some point in the future. This allows you the option of expanding the dish if necessary.

Selecting An LNA

The low noise amplifier or LNA is the super high frequency front end of your satellite receiver. An LNA's quality is most often expressed as a noise temperature. The lower the noise temperature, the better the LNA. The noise temperature reflects the amount of noise that the LNA circuitry contributes to the incoming signal. Most LNAs amplify the incoming signal by a factor of X 100,000. Any noise generated within the LNA will also be amplified, causing degradation to the satellite signal.

Within the continental U.S., a 120 degree LNA will work well with most dishes 12 feet or larger in diameter. A 100 degree LNA is often used with dishes 8 to 11 feet in diameter. If you are contemplating using a dish that is smaller than 8 feet, you may need an LNA with an even lower temperature. As recently as a year ago, an 80 degree LNA would have cost you around $3,000! However, breakthroughs in manufacturing techniques for both the LNAs and the Gallium Arsinide transistors (which are at the heart of LNA circuitry) have brought the cost down substantially. It is now possible to obtain an 80 degree LNA for under $1,000.

Some earth stations use an LNC, which is a combination of an LNA and the receiver's downconverter. The use of an LNC eliminates the need for a length of microwave coaxial cable to connect the LNA and downconverter. Since this cable is often the source of later maintenance problems, the combination of LNA and downconverter is not a bad idea. The main disadvantage of the LNC is that if it goes bad, you must obtain an identical LNC from the same manufacturer in order to get your system back on the air. When separate LNAs and downconverters are used, it is possible to swap any manufacturer's LNA for a malfunctioning unit in order to become operational.

Selecting The Receiver

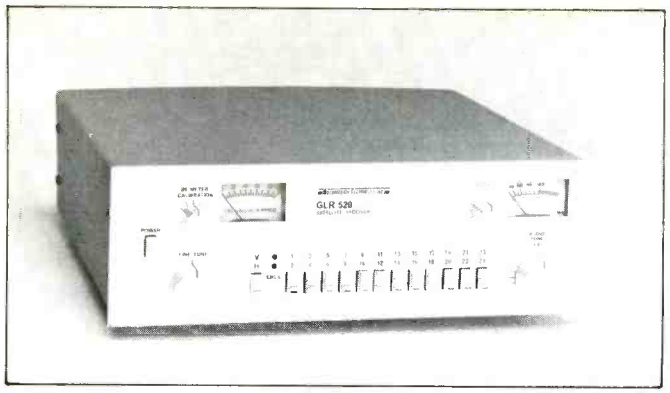
When selecting a TVRO receiver, one of the first questions that you should ask is "How long has this unit been in production?" New receiver designs are notorious for their high rate of returns due to *bugs* in the design or errors in manufacturing techniques. It takes most manufacturers some time to achieve a high level of quality control. You'll be better off buying a receiver that has been around for a while and has a proven track record as a good receiver. Although the "bells and whistles" of the latest TVRO earth terminal may look quite inviting, remember that you may become an unwilling guinea pig for a manufacturer's new circuitry. This can sometimes involve extensive phone calls or even the return of equipment to the factory for modification.

In the early days of TVRO technology, the satellite receivers available had a channel selector, audio control, and if you were lucky, a signal strength meter on the front panel. These days, your earth station receiver can do everything but brush your teeth for you, and I hear that feature is coming in the near future! Seriously, there are many features available, so many in fact that it would take an entire article just to describe them all. A few of them are fairly important if the operation of your earth station is to be kept as simple and as easy as possible.

Automatic LNA Polarity Many receivers can now provide an automatic selection of the correct transponder polarity. The LNA polarizer power supply is built right into the receiver, providing hands-free operation and easy installation. I highly recommend this feature.

Built-In RF Modulator If you are planning on hooking up your earth station to your regular home TV set, an RF modulator is needed to retransmit the satellite video and audio onto a frequency that your TV can cope with. Many receivers come with the modulator built right into the unit. This eliminates an extra box, wires, and AC plug which would otherwise adorn your living room.

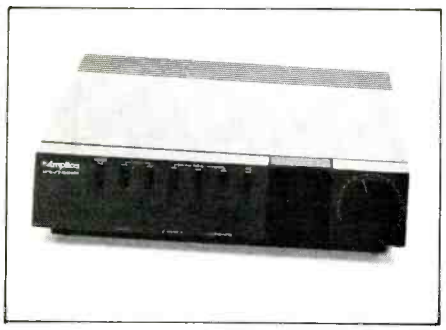
Stereo Audio This allows you to rock to



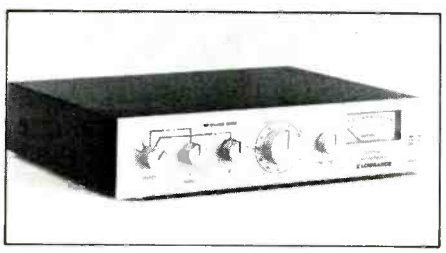
The GLR 520 Satellite Receiver by Automation Techniques, Inc. (Photo courtesy of Automation Techniques, Inc.)

The Stellarvison Equinox Satellite Receiver Model 102, manufactured by GRE America. (Photo courtesy of GRE America)

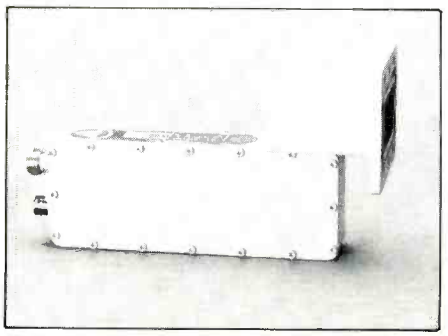
Sky Eye VI TVRO Receiver. (Photo courtesy of KLM, Inc.)



The Amplica Satellite Receiver. (Photo courtesy of Amplica, Inc.)



System 7 Satellite Receiver by Lowrance. (Photo courtesy of Lowrance Electronics)



The Amplica, Inc. low-noise amplifier. (Photo courtesy of Amplica, Inc.)

the sounds of your favorite pop music artists and enjoy high fidelity and audio from feature movies and other entertainment specials. Several of the cable programs carried via satellite transmit in stereo.

Wireless Remote Control Many receivers have a remote control keypad which gives you the option of controlling your earth station from the comfort of your easy chair. These hand-held units use an infrared light beam to carry the control codes from the keypad to the receiver. Some of these receivers put all the controls at the keypad. The rest of the receiver is little more than a black box which sits on the shelf. If purchasing one of these, you may want to buy an extra remote control, so that if the original one is apprehended by the kids or lost, you can still switch channels.

Antenna Actuators While it is possible to manually crank the dish to move it from satellite to satellite, most people are opting for a motorized antenna actuator which can be controlled from the comfort of ones's living room. You will certainly appreciate this convenience in the middle of the night or during a rain or snow storm. Antenna actuators are selected to be compatible with your dish. A few receivers even incorporate the control of the antenna into the design of their receiver.

If you would like to learn more about satellite television, *The World of Satellite Television* by Mark Long and Jeffrey Keating is available from: Solar Electronics, 156 Drakes Lane, Summertown, Tennessee 38483. The price is $8.95 plus $1.00 for postage and handling.

Selected English Shortwave Broadcasts

BY GERRY L. DEXTER

Note: Some segments feature partial English only. Some continue into the following hour or start during preceeding hour or hours. Frequencies listed are not necessarily the only ones that may be in use. Such stations as The BBC, Radio Moscow, VOA, and others have virtual 24 hour a day English programming on some channels. This is a representative list of English programming and is not intended to be a compilation of everything available during a given hour. All times are in GMT.

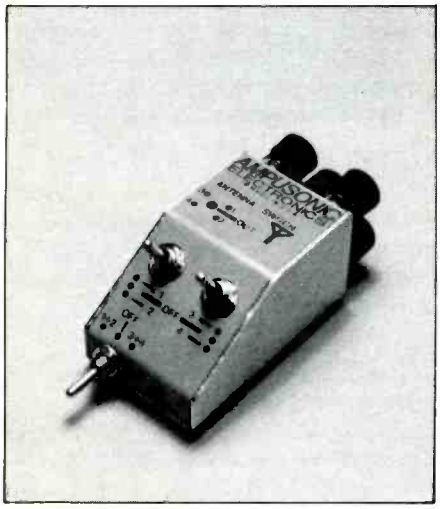
Time	Station	Frequencies
0000	Radio Sofia, Bulgaria	9.700, 11.720
	REE, Spain	11.800
	Radio Beijing, China	11.650, 15.120, 15.520
	Radio Japan	15.300, 17.825
	Radio Kiev, Ukranian SSR	9.685, 11.790, 15.100, 15.240
	Radio Havana Cuba	11.930, 11.760
	Voice of Israel	7.410, 9.815, 11.655
	Voice of Nicaragua	5.955
	BRT, Belgium	9.880
	BBC, London	11.750, 15.260
0100	TGNA, Guatemala	3.300
	Radio Belize	3.285
	Swiss Radio International	6.135
	Voice of Germany, W. Germany	6.404, 6.085, 6.145, 11.865
	BBC, London	6.175
	Radio Canada International	9.535
	BRT, Belgium	7.465
	Radio Prague, Czechoslovakia	5.930
	Voice of Greece	9.865
	RAI, Italy	9.575
	Radio Bucharest, Roumania	5.990
0200	Radio Cairo, Egypt	9.475, 12.000
	Radiobras, Brazil	15.290, 17.830
	BBC, London	9.765
	Radio Netherlands	9.590, 6.165
	RBI, E. Germany	11.920
	Radio Budapest, Hungary	9.530, 9.585, 9.835
	Radio Sweden	9.696, 11.705
	Radio Beijing	11.650, 15.120, 15.520
	Radio Japan	15.195, 17.825
	Radio Polania, Poland	6.095, 6.135, 9.525, 11.815, 15.120
	Voice of Free China, Taiwan	11.740
0300	Radio Canada International	9.755
	Radio Tirana, Albania	6.200, 7.120
	Voice of Kenya	4.934
	SRS, Surinam	4.850
	Radio Cairo, Egypt	9.745
	Radio Sweden International	9.695
	Radio RSA, South Africa	11.730
	Radio Portugal	6.025
	RBI, East Germany	9.560
	Voice of Free China, Taiwan	17.800
	Radio Prague, Czechoslovakia	7.345
	UAE Radio, United Arab Emirates	9.595, 11.755

Time	Station	Frequencies
0400	Radio Sofia, Bulgaria	7.115
	Radio Uganda	5.026
	Radio RSA, South Africa	9.585
	Radio Beijing, China	11.650
	Radio New Zealand	15.485
	Radio Australia	17.895
0500	Radio Casino, Costa Rica	5.954
	Radio Netherlands	6.165, 9.590
	Radio Portugal	6.015
	Voice of Nigeria	15.120
	HCJB, Ecuador	6.095, 11.910
	UAE Radio, United Arab Emirates	17.700
	Voice of Israel	9.815
	Radio Japan	15.325
	Voice of Nigeria	7.255
	Vatican Radio	9.645
0600	HCJB, Ecuador	6.095, 11.915
	RBI, East Germany	6.080
	GBC, Ghana	3.350, 4.915
	SLBC, Sierra Leone	5.980
	Radio Cook Islands	11.760
	ELWA, Liberia	4.765
0700	HCJB, Ecuador	6.130, 11.925
	Papua New Guinea	9.520
	Radio RSA, South Africa	11.900
	KYOI, Saipan	11.900
	KTWR, Guam	11.840
0800	GBC Guyana	5.950
	Radio Malaysia	6.175, 9.750, 15.295
	Radio New Zealand	11.960, 15.485
	SIBC, Solomon Islands	9.545
	KYOI, Saipan	15.190
	GBC, Ghana	5.950
	VLW9, Australia	9.610
0900	TWR, Monaco	9.495
	Radio Japan	9.505
	FEBC, Philippines	11.890
	BBC, London	9.510
1000	Radio Korea, S. Korea	9.570
	Radio Australia	5.955
	KYOI Saipan	11.900
	Radio New Zealand	11.960
1100	Radio Polania, Poland	11.840
	Radio Singapore	11.940
	Radio Pakistan	11.670
	Voice of Vietnam	10.080
	Radio Pyongyang, N. Korea	9.977
	BBC, London	17.775
1200	Radio Australia	5.955, 6.045, 9.710, 17.795
	SLBC, Sri Lanka	9.720

Time	Station	Frequencies
1300	Radio Korea, S. Korea	6.135
	Radio Australia	6.060
1400	Radio Veritas, Philippines	11.955, 15.215
	BRT, Belgium	17.610, 17.915, 21.810
	Radio Finland	15.400, 21.475, 25.950
	Radio Norway	25.730
	Radio Sweden	21.615
	All India Radio	15.335, 11.810
	Radio Korea, S. Korea	9.750
1500	HCJB, Ecuador	15.155
	Vatican Radio	11.810
	Radio Budapest, Hungary	15.160
	Radio Canada International	11.820
	Swiss Radio International	21.570
	Austrian Radio	11.855
	Radio Prague, Czechoslovakia	21.505
	Voice of Germany, W. Germany	21.600
	Radio Netherlands	11.735
	Radio Amman, Jordon	9.560
1600	Radio France International	15.200, 15.300, 17.620, 21.685
	Radio Pakistan	15.530
	Radio Korea, S. Korea	11.830
	Radio Portugal	21.685
1700	Radio Pakistan	11.670
	Voice of Nigeria	11.770
	BBC, London	17.830
	Radio New Zealand	15.485
1800	Radio Netherlands	11.930, 17.695
	Radio Norway	21.705
	Radiobras, Brazil	15.390
	Radio Kuwait	11.675
1900	Radio Norway	11.850
	HCJB, Ecuador	17.790, 21.480
	Radio Kuwait	11.675
2000	Radio Portugal	11.775
	REE, Spain	15.375
	RTVA, Algeria	9.685, 15.160
	VOIRI, Iran	9.022, 9.765
	Radio Yugoslavia	6.100, 7.240, 9.620
	BBC, London	11.820, 15.400, 15.260
	Voice of Israel	11.637
2100	Radio Free Grenada	15.045
	RBI, E. Germany	9.620
	Voice of Nigeria	17.800
	Radio Sweden	11.955, 15.240
	Radio RSA, South Africa	11.900
	Voice of Germany, W. Germany	9.765
	Radio Havana Cuba	17.880
	Radio Baghdad, Iraq	9.745
2200	Radio Canada International	15.325
	Radio Polania, Poland	7.125
	Radio Yugoslavia	9.620
	Voice of Turkey	7.155
2300	Radio Prague, Czechoslovakia	6.055
	Radio Luxembourg	6.090
	Radio Mediterranean, Malta	6.110
	Radio Jamahiriyah, Libya	11.815
	Radio Pyongyang, N. Korea	9.745, 15.230

PRODUCTS

REVIEW OF NEW AND INTERESTING PRODUCTS



Ampusonic ATS-1, ATS-2 Antenna Switch

Ampusonic Electronics introduces the ATS-1 and ATS-2 antenna switch. Specifically designed for communications monitoring, it is housed in an aluminum enclosure measuring only 2½" × 1½" × 1¼". Using 3 position microswitches, the user is able to switch between 4 antennas or combine the inputs of any 2 or 3 antennas instantly (without the hassle of disconnecting and reconnecting wires).

The switch is available with either Motorola type jacks (Model ATS-1) or with binding posts which accept bare wire and banana plugs (Model ATS-2).

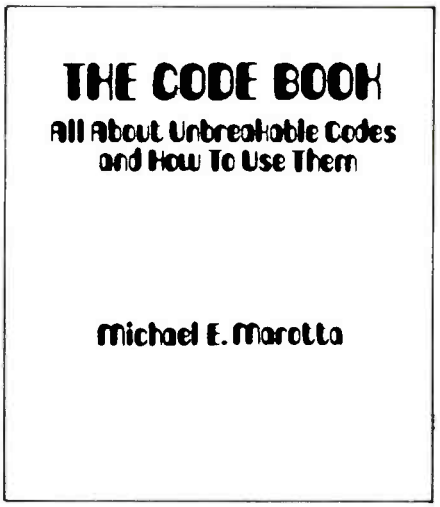
Price is $29.95 postage paid in the U.S. For more information write to: Ampusonic Electronics, R.C.U. Box 652, New York, NY 10185 or circle number 113 on the reader service card.

"The Code Book"

The Code Book (Revised Second Edition), by Michael E. Marotta, is the only book written for the layman to reveal little-known methods of working with "unbreakable" codes. It contains information that permits you to keep whatever secrets you want—from anyone; communications messages, financial records, times, places, radio frequencies, or whatever information you want to keep from prying eyes. Complete instructions for writing codes by hand, using pocket calculators, and using microcomputers are easily explained in understandable language. No knowledge of math or cryptology is needed to understand the easy-to-follow instructions given in *The Code Book*. Topics covered include: one-time pads, function ciphers, one-way codes, obfuscation, secrets and secrecy, random alphabets, and lots more—including an extensive bibliography and tables of random numbers. The book is fully illustrated with photos, charts, tables, and pictorials.

Obscure secrets known only to international agents and professional cryptographers are now revealed for your own use. Everything you need to know in order to write these codes and have complete privacy of information is presented. The first draft of this fascinating book was completed as a paper for presentation at The American Institute of Aeronautics and Astronautics minisymposium at Holloman Air Force Base and White Sands Missile Range.

The Code Book, by Michael E. Marotta, is available from CRB Research, P.O. Box 56, Commack, NY 11725. The price of the book is $7.95; add $1.50 for First Class Mailing, or seventy-five cents for mailing by Book Rate.



Cobra Introduces "Command Call," New Hands-Free, Voice-Activated FM Two-Way Communicator

Dynascan's Cobra Communications Product Group has introduced a new FM two-way transceiver designed for portable, hands-free operation over a nominal range of one-quarter mile (400 meters), and a maximum range of one-half mile (800 meters). Offering the option of voice-activated (VOX) or push-to-talk operation, the unit provides dependable noise-free two-way communications.

The Model HC-200 "Command Call" portable unit comes complete with lightweight adjustable headband, earphone, and electret condensor boom microphone. The antenna can be used coiled on the headband, or released to extend vertically for greater range.

The receiver and power supply are totally self-contained in a case that measures 4⅞" high × 2½" wide and 15/16" deep. Controls include Push-to-Talk/VOX switch; VOL/Hi-Med-Lo switch; MIC/Hi-Med-Lo switch; and Push-to-Talk switch. A removable belt clip is supplied for easy carrying.

Some of the many applications for "Command Call" units include recreational uses such as bicycling, jogging, hiking, camping, hunting, and fishing; industrial uses such as in warehouse operations, in building maintenance operations, and on construction sities.

Power is supplied by a standard 9-volt battery (not furnished). The HC-200 is available at electronic specialty stores, department stores, catalog showrooms, and chain stores. List price is $59.95 per unit.

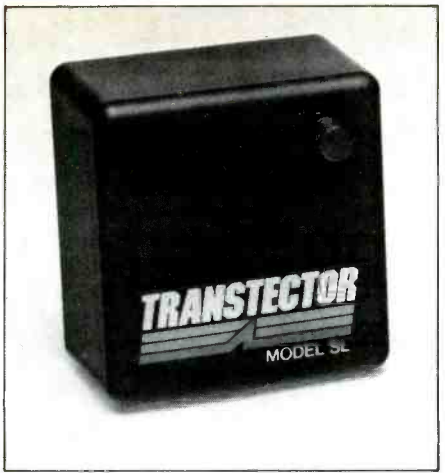
For more information, contact Cobra Communications, 6460 W. Cortland St., Chicago, IL 60635, or circle 102 on the reader service card.

Transient Surge Protector

Developed specifically to provide powerline protection to the growing personal electronics market, the Model SL plug-in protector is designed to use with scanners, transceivers, receivers, home computers, audio equipment and stereos, televisions, video tape recorders, home telephone systems, and other solid-state home electronics. The unit is manufactured by Transtector Systems of Post Falls, Idaho, and will be marketed through computer stores, stereo dealers, and other retail outlets.

The SL will plug into any grounded 110 volt outlet and accepts all standard, three-prong plugs. It automatically cleans incoming powerlines of overvoltage transients and spikes, eliminating the major cause of damage to sensitive solid-state components by providing the protected equipment with the level of power it was designed to use.

Transtector's Model SL will dissipate transients within a response time of five billionths of a second or less (five nanoseconds). The SL also has an instant reset providing continuous, uninterrupted protection and is UL Listed.



The SL measures approximately 3" × 3" × 3" and is available in four colors—black, blue, ivory, and beige. It carries a 90-day replacement warranty and has a manufacturer's suggested retail price of $99.

For additional information, contact Transtector Systems, E. 5250 Seltice Way, P.O. Box 1299, Post Falls, ID 83854, or circle number 111 on the reader service card.

Quartz Controlled Wall Clock

MFJ introduces its new 24 hour quartz controlled wall clock. Its huge 12 inch diameter face gives excellent visibility across a radio room.

This clock is quartz controlled for accuracy to within 15 seconds a month. A sweep second hand makes precise reading easy.

A single "AA" battery provides over one year operation, immunity from power line failure, and eliminates a power cord. The battery is not included.

An attractive, high impact, brown plastic case with glass front makes this 24 hour clock a handsome addition to any room.

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

The MFJ-105 clock is available from MFJ Enterprises, Inc. for $49.95 plus $4.00 shipping and handling.

To order, call toll free 1-800-647-1800 and charge it to your Visa or Master Card account or mail order to MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762.

New High Resolution SSTV Converter

High resolution slow scan television (SSTV) is now here with the introduction of VIDEOSCAN 1000 by Microcraft Corp.

The unit is completely compatible with amateur-standard SSTV and first generation equipment. That is, VIDEOSCAN can convey high resolution, 8 second, 128 line SSTV pictures to first generation scan converters using current standards. However, VIDEOSCAN stands alone with the introduction of two separate high resolution modes. In these modes, the TV picture utilizes the full 256 TV lines and 256 picture elements (pixels) per line four times better than earlier units, resulting in pictures that truly rival commercial TV quality. The pixels are quantized to 64 levels of gray . . . four times better than first generation units. Consequently, no contouring (false edges) are introduced to detract from the picture.

VIDEOSCAN is a second generation scan converter that employs the latest concepts and technology. Some noteworthy features of VIDEOSCAN are:

- SPLIT-MODE—This is a special mode that enables viewing four regular 8.5 second SSTV pictures at one time on the TV monitor as they are received.
- STOP MOTION—A single frame of video may be grabbed into memory from a TV camera manually or automatically, thus stopping motion.
- CURSOR—A cursor dot appears on the screen to indicate the current line being transmitted.
- GRAY SCALE; CALL SIGN—Mode selector activates a gray scale and optional "call sign," which are super-imposed on picture in memory.
- STATION SWITCHING—All necessary switching between transmitter, microphone, and tape recorder is included in VIDEOSCAN.

Microcraft is presently working on a computer input/output port and a color conversion of the VIDEOSCAN 1000.

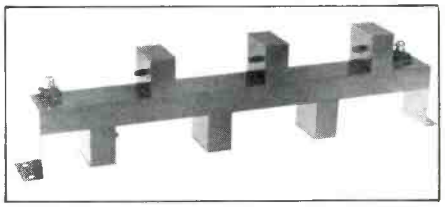
The VIDEOSCAN 1000 is available as a complete kit for $595, or wired and tested for $795 plus $6 for shipping. Shipments are made world-wide. A free brochure on VIDEOSCAN 1000 and "Getting Started in SSTV" are available from Microcraft. Microcraft Corporation, P.O. Box 513, Thiensville, WI 53092, or circle number 109 on the reader service card.

50 db Interference Trap

The model #4168C is a microwave trap with a deep notch and narrow 3 db bandwidth, used for preventing strong microwave carriers from reaching TVRO earth station downconverters. The trap will block out telephone carriers (offset 10 MHz from transponder center frequencies) with a 50 db notch (minimum) with a 3 db bandwidth of 5 MHz (maximum).

The #4168C is tuned to customer specified microwave offenders. Connectors are type N and the unit passes DC power. WR-229 waveguide connectors are also available (model 4168 LNA).

Price is $90 plus $270 per microwave carrier trapped. Delivery is 10 days. For more information, contact Emily Bostick, Microwave Filter Co., Inc., 6743 Kinne St., East Syracuse, NY 13057. U.S. toll-free 1-800-448-1666 or circle number 107 on the reader service card.



Local Scanner Listings

Scanner Radio Listings is a localized publication presently in six editions, each covering a particular area. There are listings for police, fire, ambulances, etc., as well as listings for a variety of others.

There are editions covering: Dayton/Cincinnati areas, including northern Kentucky and southern Indiana; Fort Wayne/Lima area including Bellefontaine and Findlay areas in Ohio, as well as Muncie area in Indiana; Toledo area edition covering northwest Ohio from Sandusky to Bryan and the three southern Michigan counties bordering Ohio. There is also an edition for the Columbus, Ohio area, including southern Ohio and such cities as Chillicothe and Newark. Also, there is an edition covering the Louisville and Lexington areas of Kentucky; including listings from southern Indiana. Finally, there is an edition covering the Bay Cities area of Tampa and St. Petersburg in Florida.

The book is organized into three sections: alphabetical by licensee name, alphabetical by call letters, and the radio services section. In the radio services section, the frequencies are listed under the area they most closely identify with, i.e. Police, Fire, etc.

A new feature, started with the Toledo, Ohio edition, is the "County Print Out." The purchaser of the directory, by furnishing the proof of purchase provided in the book (along with an SASE), can receive a print out of frequencies in the county of his choice from those listed in the booklet. The print out comes on a handy card ready to carry in the car or pocket.

For additional information on any of the booklets mentioned, contact Norman Schrein at Chillicothe Communications, 1107 Sharewood Court, Kettering, OH 45429.

SURVIVAL

BY R.L. SLATTERY

ESTABLISHING SURVIVALIST COMMUNICATIONS SYSTEMS

A few columns back down the line (February), I briefly discussed the possibilities of obtaining a license from the FCC to operate a radio communications system, mentioning that certain qualifications must be met by people seeking licenses under FCC Part 90 governing the Private Land Mobile Radio Services. Incoming mail at the *POP'COMM* office in the aftermath of that column has made it apparent that I could have (maybe should have) delved deeper into the topic. Instead of simply listing the names of some of the various radio services included in the FCC's Part 90 and letting it go at that, it would seem (to say the least) that I should have discussed the specific qualifications applicable to those who seek licenses under Part 90. About a week ago, I decided that it was futile to attempt to answer each and every letter that has arrived asking for more information and I'm hoping that this column will delineate these various radio services and let you know how and if you might qualify for FCC licenses in any of them.

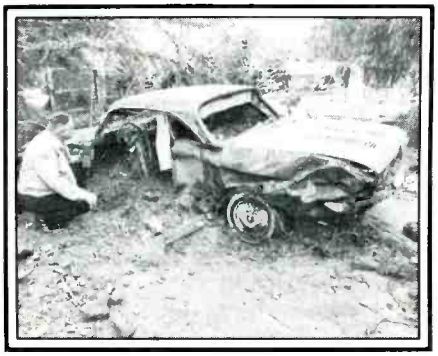
Here's the deal. When you fill out the FCC form for obtaining a license under Part 90, the FCC is going to ask you not only the name of the radio service in which you hope to become licensed, they will be hoping that you somehow meet the qualifications they've set out for becoming licensed in that service. That is to say, if you hope to be licensed in the Manufacturer's Radio Service, will the FCC think that you deserve to be?

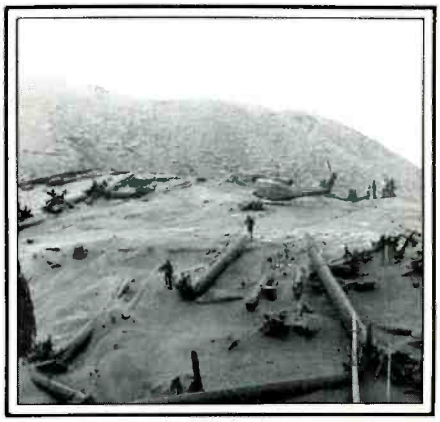
The Public Safety Radio Services

The group of Part 90 radio services that comes under the general heading of Public Safety consists of Local Government, Police, Fire, Highway Maintenance, and Forestry Maintenance services. The only licenses issued are given out to state, county, and local governmental entities or authorities. Individuals or private organizations or companies cannot normally obtain any licenses in these services—except under rare and unusual conditions which call for their communications to be coordinated with (for instance) a fire agency, for the best interest of the general public. A large number of frequencies 30 to 50, 150 to 162 MHz, and UHF are available.

Special Emergency Radio Service

The Special Emergency Radio Service covers medical services, rescue organizations, veterinarians, handicapped people, disaster relief organizations, school buses, beach patrols, establishments in isolated areas, communications standby facilities, and emergency repair of public communications facilities. Each of these categories is explained in specific detail in FCC Part 90 so that people will know what the FCC means when it says (for instance) that handicapped people qualify. The categories of "rescue squads" and "establishments in isolated areas" would seem to offer a number of interesting potentials for Survivalists seeking communications licenses.





U.S. Army photo

Industrial Radio Services

While some of the so-called Industrial Radio Services would seem to permit many to qualify, it is unlikely that most persons or groups could qualify in the Power Radio Service, Telephone Maintenance Radio Service, or Relay Press Radio Service.

One of the Industrial Radio Services is the Forest Products Radio Service, and amongst those who would qualify are those primarily engaged in tree logging, tree farming, or related woods operations. People who have moved into isolated woodland retreats could possibly qualify for licenses in this service, which is especially appealing because of its uncrowded frequencies.

While at first it would not seem that most individuals would qualify for licensing in the Motion Picture Radio Service, the FCC makes those qualifications very liberal and says that licenses are available to "persons primarily engaged in the production or filming of motion pictures," stating that communications must be essential to such activities of the licensee. Of course, the communications must relate to various specific activities of the licensee relating to the radio service for which the license is granted. This is a standard tenet of FCC licenses, be the license in the Motion Picture or Police Radio Service. You can't dispatch police cars with a Motion Picture Radio Service license, nor can you use a Police Radio Service license to help you shoot films. Nevertheless, the Motion Picture Radio Service channels (which are shared with other services) are not crowded and they do offer some interesting possibilities to the creative Survivalist.

Special Industrial Radio Service licenses have a very high potential use for Survivalists since they can be obtained by persons requiring communications in relation with the operation of farms, ranches "or other similar land areas" for the quantity production of crops or plants, vines or trees (excluding forestry operations); or for the keeping, grazing, or feeding of livestock for animal products, animal increase, or value enhance-

ment; also qualified are those who are plowing, soil conditioning, seeding, fertilizing, or harvesting for agricultural activities. Livestock breeders qualify for licenses, as do those who spray or dust with insecticides, herbicides, or fungicides (other than inside of buildings). Actually, there are many other areas open for those who seek to qualify for a license in this radio service, including commercial road construction, sewer construction, mining operations, even delivering ice to customers! Almost anybody with a legitimate Survival retreat would seem to qualify under one or more categories for a license in the Special Industrial Radio Service and, in fact, many Survivalists have licenses in this service. A popular Survivalist frequency in this service is 151.505 MHz.

While the Special Industrial Radio Service is somewhat of a catch-all service, its broad scope is matched by the Business Radio Service. The FCC says that you can get a license in that service if you are "engaged in a commercial activity," or if you require communications as a clergyman. That leaves open just about everything, including those who own hot dog wagons to those having a $5 mail order ordination from the First Church of The Sacred Frammis. Let's face it, if Jim Jones could have been qualified for a license in the Business Radio Service, then anybody probably qualifies!

Some possibilities may also be offered in the Manufacturers Radio Service. Licenses may be granted to those persons primarily engaged in producing new products within shipyards, plants, factories, or mills which use power-driven machines and materials-handling equipment.

Land Transportation Services

The Land Transportation Radio Services are a group of services which have potentials—with the exception of the Railroad Radio Service, which is available only to, well, railroads!

One of the components of this group is the Motor Carrier Radio Service, and you may qualify for a license if you transport, distribute, or collect property within a single urban area, or transport property between urban areas, or transport passengers within or between urban areas. This doesn't include sightseeing buses, special charter vehicles, school buses, or taxi cabs.

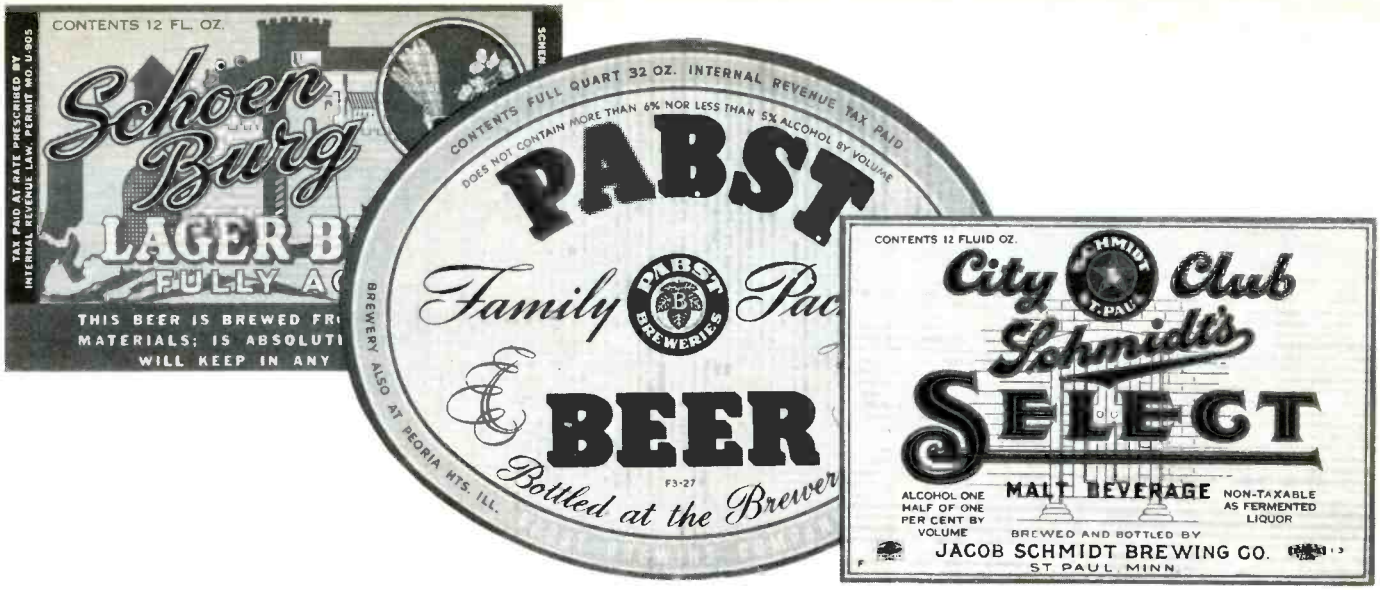
The Taxicab Radio Service is available to those "regularly engaged in furnishing to the public for hire a nonscheduled passenger land transportation service not operated over a regular route or between established terminals."

The Automobile Emergency Radio Service is available to persons "regularly engaged" in "the operation of a private emergency road service for disabled vehicles by associations of owners of private automobiles, or those engaged in the business of providing to the general public an emergency road service for disabled vehicles."

As you can see, the options are there within Part 90 to validly qualify for an FCC communications license in your choice of several radio services. Operating within the conditions of that license grant is another story altogether, and is within control only of the licensee. Naturally, within the context of an actual widespread major disaster, emergency situation, or other long-term calamity, the FCC would be hardly likely to pursue those who were utilizing licensed communications equipment for genuine emergency communications which were outside the terms of the original license grant, especially if it were a question of the safety of life and property.

There is also the option to operate under Part 15 (low power unlicensed units on 49 MHz) or Part 95 (27 MHz AM or SSB low power communications which will soon require no license). Part 95 also includes the General Mobile Radio Service (462 MHz FM) which is appealing for Survivalist communications. The FCC has made these services available to the general public in such a manner that practically any citizen may use them without significant hurdles to hop over.

A few readers have asked why we did not suggest the use of the so-called Part 15 "lowfer" unlicensed communications band, which lies below the standard AM broadcasting band. This band has not been suggested for general Survivalist communications use because in its present stage of evolution, it is far better suited to use for experimental hobby communications via CW than it is as a viable form of Survival communications for most folks. That is to say there are many other ways of communicating at the present time which are more readily available, less expensive, easier to use, offer more range and ease of operation than the Part 15 "lowfer" band—although for experimenters and persons interested in the pure joy of communications, hobbying that band is almost without equal.



Scanning America's Great Breweries

Could Be A Vanishing Breed! Hear Them Now!

BY RICK MASLAU, KNY2GL

In 1870, there were 3,286 breweries in the United States. One hundred years later, there were only 144 in operation, although those 144 breweries produced almost 25 times the amount of beer than did their earlier counterparts. Smaller breweries producing beer for local distribution were especially hard hit by Prohibition (the national "dry" law which was in effect from 1920 to 1933). Since that time, they have been plagued by equipment and facility obsolescence, increased cost of labor and raw materials, transportation and packaging costs, and competition from a relatively few larger "national" breweries. Although there has been a recent trend toward small limited production specialty breweries offering local "connoisseur" beers, the major production of beer in the U.S. remains in the hands of a relatively small number of breweries.

This is true despite the fact that beer is the nation's most popular adult beverage, and this has further encouraged a large number of enthusiasts who collect brewery memorabilia, old beer cans, beer serving trays, bottle openers, coasters, bottles, and ever so much more. There is a large national organization of can collectors and now there is even a national beer magazine. Books by the score have been published on the topic and it seems that one out of every five ads you see on TV or hear on the radio is for beer.

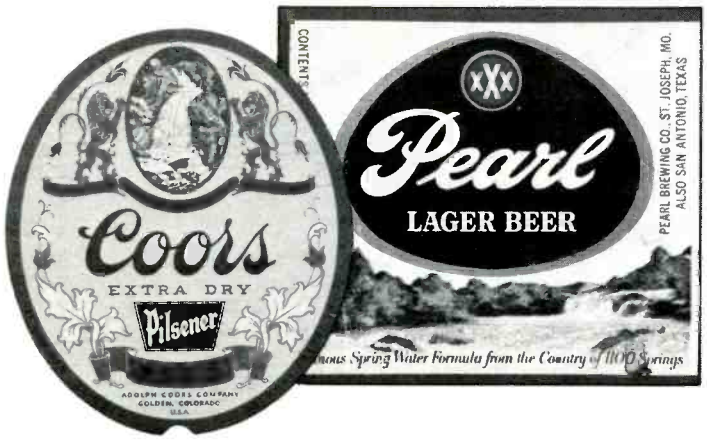
Thusfar, it appears that the only aspect of all of this which may not yet have been touched upon is how and where to hear the remaining breweries on a scanner! Inasmuch as the field does appear to be narrowing down, we thought that the time might be right for you to scan these channels while there is still a sufficient variety of breweries left to make the effort worthwhile. Two-way communications at breweries may be used for security patrols and also for speeding along the normal production process.

In compiling our roster, we made no effort whatsoever to include beer importers, distributors, or dealers; we wanted only the actual breweries. Some well-known breweries aren't included (such as Ruppert and Lone Star) and this was not intended as a deliberate exclusion. It was because we haven't been able to confirm that each and every active brewery actually uses two-way communications. Any readers having additional information are invited to pass it along to us here at *POP'COMM*. All of the frequencies are MHz.

American Breweries

Anheuser Busch Inc.		
Brinkley, AR	KZ4565	154.57
	WZK515	462.275
Clayton, MO	KKX660	464.45
Columbus, OH	KJS306	153.185
Deering, ND	WST462	461.525
Dubuque, IA	KL2292	461.2875, 466.2875
Houston, TX	KGU826	153.08
	WXW655	464.575
Indianapolis, IN	KL2292	461.2875, 466.2875
Jacksonville, FL	KLR591	153.17
	WYG539	153.095
Lafayette, IN	KJH666	153.17
	KFY693	462.275
Manteno, NC	KL2292	461.2875, 466.2875
Merrimack, NH	KLZ978	153.17
Moorhead, MN	KKH946	153.26
Newark, NJ	KCL873	151.715
Oakwood, MO	KL2292	461.2875, 466.2875
St. Louis, MO	KA61095	561.5625, 466.5625
	KFC230	153.32
	KRD464	31.24
	KS3179	154.60
	WRX340	153.32
	KBR329	153.17
Tampa, FL	KAL520	151.515
	KFM736	153.05
Williamsburg, VA	KRJ209	153.26
	KWE921	463.775
	KYE652	463.425
Blitz-Weinhard Co.		
Portland, OR	WQC838	158.46
Cerveceria Corona Inc.		
Santurce, PR	WQD921	462.25
(Adolph) Coors Co.		
Golden, CO	KA65520	158.43

(Adolph) Coors Co.	KAS970	462.45
Golden, CO	KM9410	467.75, 467.775, 467.80, 467.825, 467.85, 467.875, 467.90, 467.925
	KS8754	457.60
	KS8755	462.45, 467.45
	KSD815	462.35
	KV2326	461.425, 466.425
	KYC481	461.425
	WST931	464.325
	KA69087	153.395
	KLR837	462.30
	KWO860	462.45
	KXV980	461.425
Erie Brewing Co.		
Erie, PA	KCN916	151.775
Falls City Brewing Co.		
Louisville, KY	WIG2	123.3, 123.5
	WYH3	123.3, 123.5
Falstaff Brewing		
Chicago, IL	KO5459	154.60
	KYH605	465.00
Sharpsville, IN	KO5459	154.60
Genesee Brewing Co.		
Rochester, NY	KA68192	154.57
	WRP231	451.425
G. Heileman Brewing Co.		
LaCrosse, WI	KDF872	153.08
	WRX994	153.14



Latrobe Brewing Co.		
Latrobe, PA	KKK630	151.685
Miller Brewing Co.		
Azusa, CA	KP6797	154.60
Ft. Worth, TX	KYY489	157.74
	KSE294	462.45
	KSE296	158.43
Fulton, NY	KA36283	468.85
	KA36958	461.35, 466.35
	KA6645	468.2125, 468.4125, 468.8625, 469.1125
	WXD405	153.05
	WXG309	462.30
	WYB489	463.85
Milwaukee, WI	KDN532	462.50
	KJ9622	154.60
	KKK643	153.32
	KRY444	35.92
	KSX947	461.75
	KZ8790	467.50
Olympia Brewing Co.		
St. Paul, MN	KTW670	462.825
Tumwater, WA	KES684	152.36
	KTY208	462.45

Pabst Brewing Co.		
Milwaukee, WI	KMB365	462.825
	KYA202	462.25
Newark, NJ	KF7288	469.475
	KFD747	42.96
	KTH883	154.625
Peoria Heights, IL	KU6631	457.525
	KX6457	462.35
Perry, GA	KSR851	153.08
	KGF285	464.825
Pearl Brewing Co.		
San Antonio, TX	KKW934	151.805
	KWJ591	153.275
Rheingold Breweries		
Orange, NJ	KSM718	462.325
F & M Schaefer Brewing Co.		
Allentown, PA	KTQ790	154.515
Jos. Schlitz Brewing		
Baldwinsville, NY	KES612	462.825
Lysander, NY	KXM554	153.395
Memphis, TN	KO2529	154.60
Tampa, FL	KT7864	467.275
Winston-Salem, NC	KZN220	462.325
C. Schmidt & Sons		
Cleveland, OH	KUO763	153.30
Philadelphia, PA	KVK454	462.35
	KF6385	467.20
Schoenling Brewery Inc.		
Cincinnati, OH	KA78384	154.60
Stroh Brewery Co.		
Detroit, MI	KA9935	468.2175
	KGS673	451.475

ON THE LINE

BY GORDON WEST, WB6NOA

NEW AND EXCITING TELEPHONE TECHNOLOGY

If you don't own your telephone equipment, you may be throwing your money out the window. Most home telephones rent from $3 to $8 a month. If you have two phones, double that.

Guess how much an inexpensive telephone costs? $50, $40, $30? Try $10!

These $10 telephones work great, too. Simply plug the curly cord into your modular jack, turn the phone on, and make calls. Turn the phone off, and it's ready to electronically beep when an incoming call is received. It has a keyboard pad on the front for keyboard telephone systems. If you presently have a keyboard phone setup, this phone works nifty.

Your local telephone store is scrambling for low cost phones. If they don't have what you want, try the competition. Remember, it's free enterprise, and you don't have to buy from the same telephone store where you turned in your equipment.

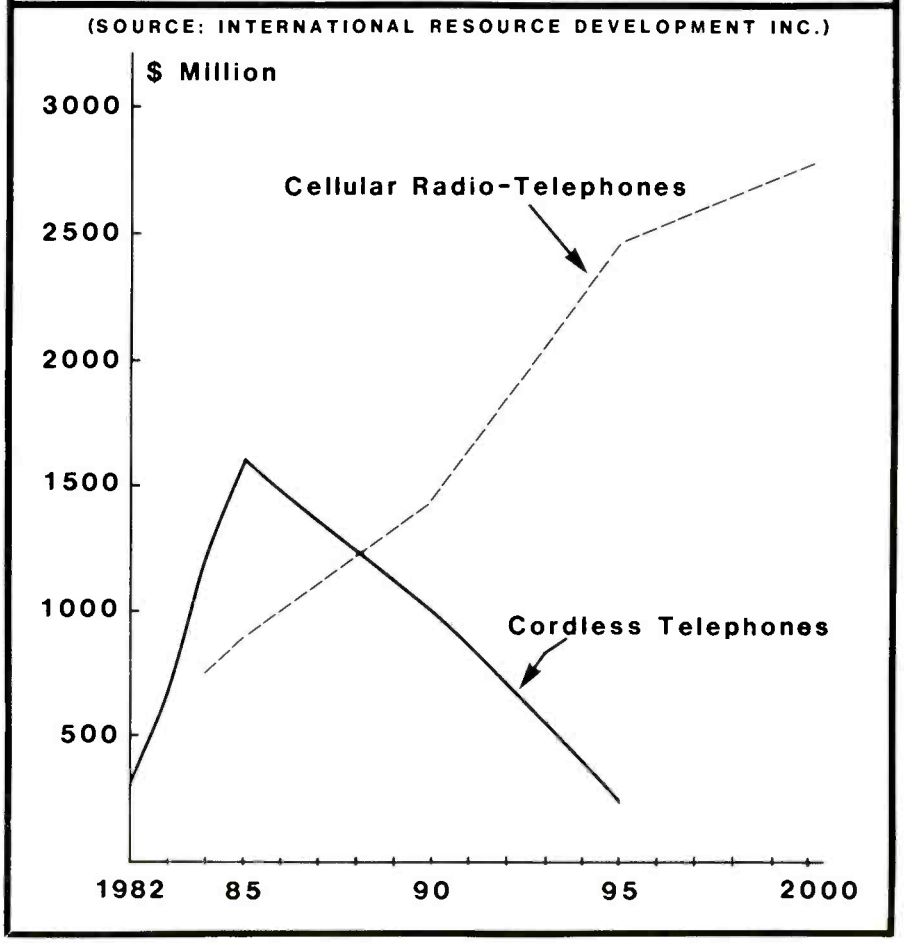
You don't even have to buy a phone that looks like a phone. I have a hunter friend who has wood decoy ducks sitting all over his desk. One of them is a telephone, but I don't know which one. Probably an electronic quack will give it away just as soon as his phone rings. He picks it up by the neck and presto, his decoy is now a regular telephone. (Natural Communications, Inc., 7584 Clairemont Mesa Boulevard, San Diego, California)

Another friend of mine has a Plexiglass telephone. You can peer into the innards to your heart's content. It's fascinating to watch the little clapper bang the bell when the phone rings.

Or how about this ringing maniac phone—picture a handset sitting on top of a gadget that looks like a mechanical Slinky. When the phone rings, the mechanical Slinky begins to rise like an agitated King Cobra. From floor level, it rises to a height of about five feet, putting the telephone at eye level. Walk over, pick it up, say your thing, and then hang it up. You guessed it—the Slinky slowly recoils to the floor, waiting for the next incoming phone call. I imagine there is some sort of foot switching in case you wish to make an outgoing call!

Whatever you want in a telephone, it's now available. If you are still using that old rotary dial set on your desk, you should plan to get with the program and give it back to Ma Bell.

The Cordless-Cellular Telephone Connection, 1982-2000



Cordless Scene

The cordless telephone industry is still going full steam ahead. Just like the CB radio industry, they are right now at the peak of their marketing cycle. It looks like there is no end in sight to sales. Wishful thinking on their part. As I predicted in my last column, expect that there will soon be a mass dumping of cordless telephones at ridiculously low prices.

Why am I predicting another CB debacle for the cordless phone industry? Take, for instance, frequency congestion. With only about five channels, the chances of getting on the same airwaves as your neighbor who also owns a cordless phone are quite possible. Sure, you can take your phone back to the seller and demand a different channel, but chances are that channel may be used by the guy across the street. With only five combinations, we are soon running out of "private channels" for our super-secret phone call.

Symptoms of someone on your same channel would be intermittent ringing of the phone when no one is really calling, conversations in the background, interrupted phone calls, and unexpected disconnects. The intermittent ringing of your handset is usually the most common symptom of co-channel interference.

Another problem facing the cordless telephone industry is the proliferation of range-extending devices. More range means more interference to your neighbor's phone system. Sure, you might be able to walk an additional 75 feet with one of those new range boost antennas, but it also means that you are going to hear units on your same frequency up to a block or so away. If you don't walk to the extremes of your present legal communications range, then don't add any illegal modification devices and antennas to your cordless set.

Besides the channel congestion and illegal modifications of the present cordless tel-

Are cordless phones doomed?

ephones, there is one thing that is soon to spell the dump—and that's new frequencies. Several cordless phone manufacturers are vying for more channels at 48 MHz, 49 MHz, and also at 72 MHz. Just as soon as the FCC goes ahead with new channels, the present sets will drop in price like CB sets did back in the 1970's.

Your cordless telephone wrist radio may soon become reality if the FCC ever starts allocating more channels to a communications system that the public is demanding.

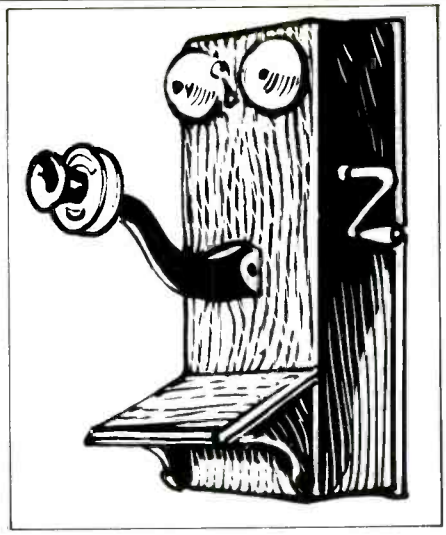
"One of the offshoots of the technology will be that, sooner or later, everyone will have their own personal telephone number, which may remain the same for life," comments the International Resource Development Company, a marketing research organization that plans products for the new cellular telephone systems.

"The new intelligent telephone networks will be able to keep track of where each individual is at all times," adds Steve Weissman of the IRD research staff. "When I dial your telephone number, you will find that the telephone closest to you rings, wherever you are. You may be wearing the telephone radio equipment within a package smaller than a pack of cigarettes on your belt," explains Weissman.

There will also be others who will be much less enthusiastic about having the telephone company's computer track their every movement.

"Perhaps the whole privacy issue will have to be handled with some new legislation, to help set aside fears about the big brother aspects of the new communications network," adds Weissman.

The General Electric plan calls for a high powered cordless phone system to be installed by the user in his car and at his house. When the phone rings at home, it will also ring in the car. GE expects about 5 to 10 mile range depending on the height of the home



antenna. This system is similar to today's cordless telephone except at different frequencies and much more power.

Users of the GE system could also rent air time through a repeater for extended range. Once again, when the phone rings at home, it also rings simultaneously in the car, but this time through a repeater for added mileage. The whole idea is to transfer the call directly at your home phone equipment, rather than going through expensive mobile telephone systems that require a separate phone number to be dialed initially.

The most common question I receive here at *Popular Communications* is, "How can I extend the range of my cordless telephone?" Obviously, users want more range so they can go to the store or off to the beach and still hear their home phone ring.

Still convinced that cordless telephone prices will remain unchanged for the next few years? Look at the accompanying graph produced by marketing experts in the field. You can probably see some bargains in the future.

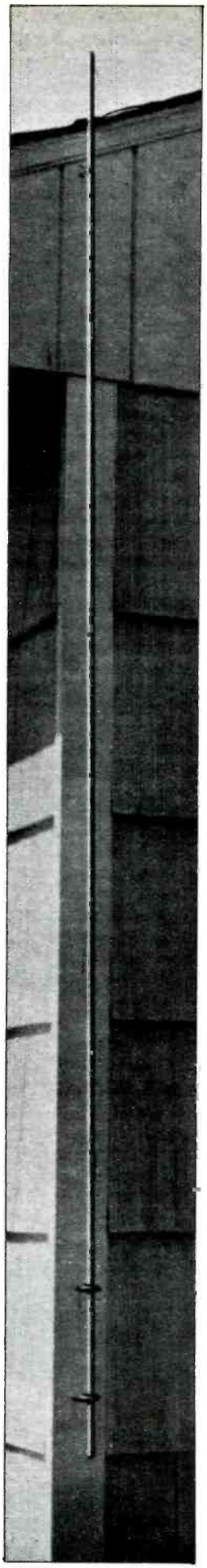
Don't get me wrong. I swear by my own cordless phone, but I don't anticipate that the price structure of these devices will remain the same in the near future. I wouldn't do without my present cordless phone for a second, but if I were going to buy one for a friend, I would start shopping around for some deals.

That's it for this month. See you next month down the line.

Build An Itty-Bitty Vertical DX Antenna

No Room For A Big Sky Hook? Try This L'il Monster!

BY RANDY FELTON, KM5GR



You see, here's the problem. All of the antennas that look like they're going to really perform and pull in the great DX stations seem to want to take up lots of space, like a small parking lot or at least the better part of a back yard. Lacking room to put up such a formidible antenna, many of us are reduced to taking a "the heck with it" stance and relying upon a drastic compromise. Often this consists of tossing 25 feet of wire out window and leaving it dangling where it may.

Here's yet another alternative, and a way of bringing in those distant SW stations. This is a small vertical antenna running only eight feet from stem to stern, and you can mount it (without headache) outside of a window. Best of all, you can tune or resonate it for maximizing its performance on your favorite bands.

Tuning it calls for the use of a small outboard unit, which is located next to your receiver. This unit makes the antenna (electrically) into a quarter-wavelength long at any frequency. Okay, so it's a space saver; but does it have anything else going for it? You betcha! Because it's a vertical, it is omnidirectional; also, it is extremely sensitive to picking up skip signals arriving at low angles. Because of this, you'll probably find yourself hearing a lot more DX than you might otherwise have heard with a horizontal antenna attached to your receiver.

As shown in the schematic, the tuning unit is made up of two variable capacitors and a tapped coil which, working together, tune about 2 to 30 MHz. When bandswitch S_1 is in position 5, the antenna itself is connected directly to your receiver. No coil is required at the high frequency end of the tuner since the antenna's eight foot length is about right for these frequencies. At the mid and lower frequency ranges, the switch inserts add inductance (by means of added coil turns) to maintain the resonance of the vertical antenna on those bands. The two variable capacitors work on all bands and provide fine tuning (peaking) adjustments. Capacitor C_1 is for loading and electrically lengthening the antenna, while the other, C_2, matches the antenna's impedance to the receiver's input.

The first position on the bandswitch, marked "GND," shorts the receiver's antenna terminals to protect the receiver's inputs when the equipment isn't in use. This is to prevent any voltage buildup in the set if there is a lightning storm in the area.

Making The Coil

The clil, L_1, is wound as shown in the pictorial of the coil. Note that the small holes are drilled 3/4" apart in the coil form to retain or hold firm the wires at the top and bottom. Start the coil at the bottom, passing it through the holes, then wind four turns. That brings you to the first tap. The tap is made simply by forming a loop in the wire. Twist the loop tightly, then scrape away the enamel at the end of the loop. This double wire should then be soldered to the appropriate log on the switch (S_1). The other tap is made in the same manner.

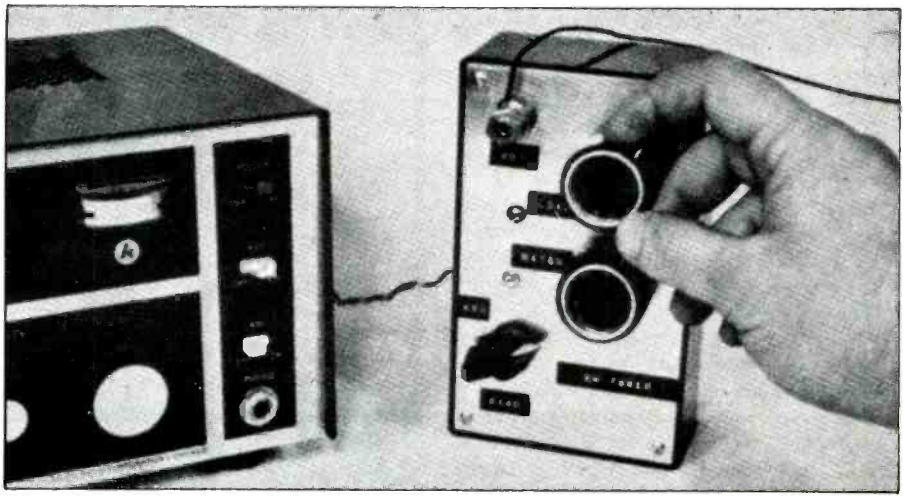
Capacitor Mounting

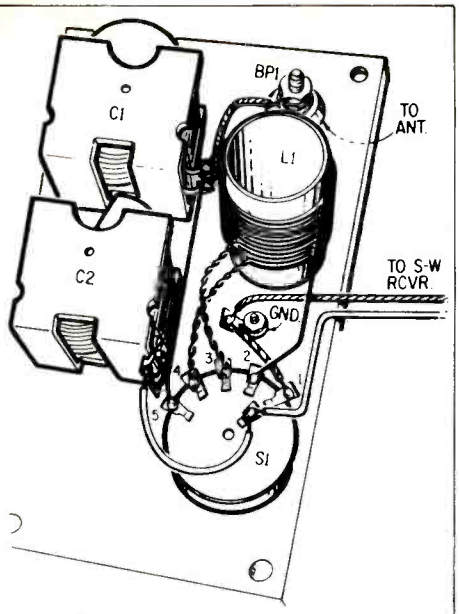
The variable capacitors have threaded holes which will accept six 32 machine screws; be careful not to let the screws contact the tuning plates. This is avoided by using screws no longer than 1/4". First install nuts on the screws to function as spacers. They'll stop the screw heads from touching the plates of the capacitors.

Connection To Receiver

The wires from the tuner to the receiver should be twisted hookup wire (any length will do). If your receiver has antenna terminals marked "A" and "G," just connect the A and G wires from the tuner to those posts. If your set has another antenna ("A") terminal, run a jumper between one of the A terminals and G. This sets up the receiver for an unbalanced line and that's what the twisted pair is. Since a vertical antenna likes to

Fig. 1 — The antenna tuner should be placed next to the receiver. Variable capacitors and bandswitch are used to make the antenna resonant at the particular frequency you wish to tune. You'll see a difference on the S-meter.





Parts List
BP1—Insulated binding post
C1, C2—.10-3635 μ μf variable capacitor
L1—Coil, No. 22 enameled wire wound on 1" dia. form
S1—1-pole, 5 position rotary switch. (Mallory 3115J or equivalent)
Misc.—Bakelite utility case with aluminum panel, No. 22 enameled wire, 3/8" aluminum rod, TV standoff insulators

Fig. 2—Underside of panel shows the position of the components. The leads to the shortwave receiver should be twisted. Put a large knot in them to act as a strain relief.

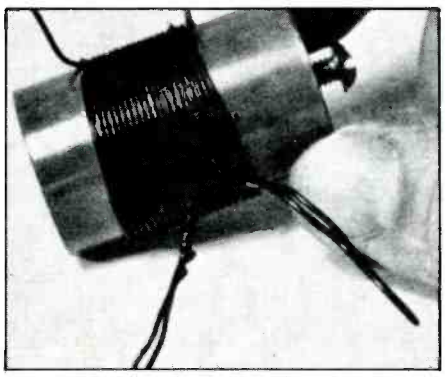


Fig. 3—Detail of L1. Two leads at top are ends of coil. Bottom leads are twisted loops that form coil taps. Screw at right mount coil on panel.

work against a good ground, make certain that there is a good ground connection to the receiver (such as a cold water pipe).

The antenna itself consists of a 3/8" diameter 8 foot long aluminum rod, although you might make do with a 108 foot steel (CB type) mobile whip antenna and a 4 inch base spring instead. If using the 8 foot aluminum rod, mount it on the side of the house with screw-in type TV standoff insulators which will hold and insulate the rod. Should the rod not fit into the plastic insulators, just open up the loops slightly. You can then use pliers to squeeze the loops closed again so that they hold the rod snugly. A hole drilled at the base of the rod accepts a sheet-metal or other screw for connecting the lead-in

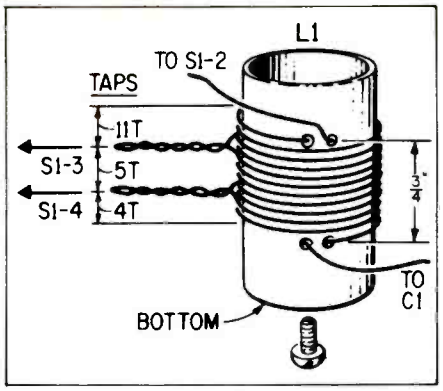


Fig. 4—L1 details. Drill two pairs of holes in form 3/4" apart. Fish wire through bottom holes, then start winding and pull out loops for taps.

wire to the tuner. Be sure to cover over this connection with silicone or other similar sealant putty to prevent it from going bad due to moisture. Of course, always be especially careful when locating the rod so that during or after installation it could not possibly come into contact with any electrical power lines, thus posing a definite and most serious safety and shock hazard which could affect life and property.

Of course, there are yet other possibilities for the antenna ailment. You might opt for forgetting about the aluminum rod or steel whip and simply run out eight feet of wire between the standoff insulators. Make certain that the wire is run in a vertical axis and keep it away from any large masses of metal that might lessen its operation (such as drain pipes or down spouts).

Your shortwave receiver should be located somewhat near the window or wall where the antenna lead-in enters. Be certain that the length of the antenna lead-in is no more than about 12 feet so that the 8 foot antenna will continue to act like a quarter-wave type throughout its operational range and remain sensitive to signals arriving at low angles.

Operating It

Now that you've got everything all hooked up, place S_1 in any of the four positions above GND. Although the positions aren't marked, the tuner resonates the vertical on increasingly higher frequencies as the switch is rotated clockwise. Try different positions and rotate C_1 and C_2 for the highest S-meter reading on a given signal. If your receiver has no S-meter, tune for loudest sound.

After you've finished listening, throw S_1 to the GND position. It won't do much good if lightning scores a direct hit on your location, but it will drain off any static charges that tend to accumulate during a bout with an electrical storm.

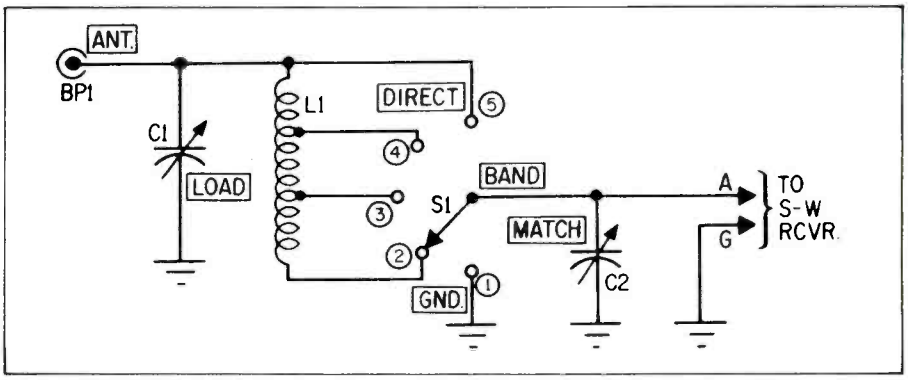


Fig. 5— Tuner schematic. Variable capacitor C1 electrically lengthens the antenna. C2 matches the antenna's impedance to that of the receiver. Set switch S1 to different taps on L1 to peak the level of the signal you want to hear.

Fig. 6—Closeup of inside of tuner. All parts are mounted on aluminum panel supplied with cabinet. Twist the lead (right) to the shortwave receiver.

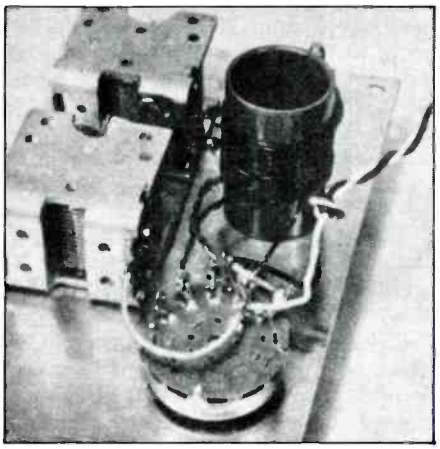
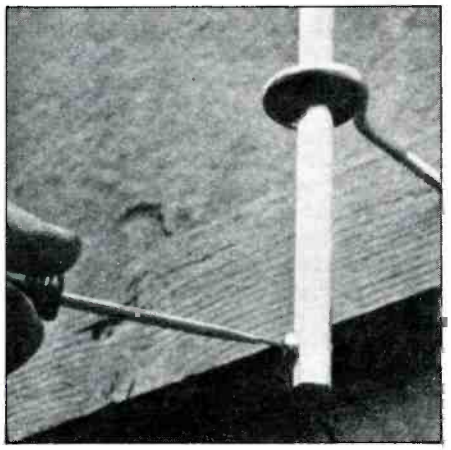


Fig. 7—Fasten lead-in wire to bottom of vertical element with nut and bolt or sheet-metal screw. TV standoff loop should be squeezed to hold rod.



LISTENING POST

BY GERRY L. DEXTER

WHAT'S HAPPENING: INTERNATIONAL SHORTWAVE BROADCASTING BANDS

DXing, unlike bowling or golf or square dancing, is mostly a solitary hobby. The great majority of DXers don't have a fellow "nut" just down the block that they can visit with regularly. Contacts among DXers are usually limited to the occasional visit, correspondence, or long distance phone call.

So, an opportunity to get together with like-minded people for an entire weekend becomes quite an event. Some regional groups plan meetings every month or two; a couple of the national clubs have annual conventions. But the biggest such gathering is the Annual Convention of the Association of North American Radio Clubs, where DXers and listeners of all interests (whether they're members of any particular club or not) are welcome.

This year's ANARC convention is being hosted by the Washington Area DX Association and will be held at the Westpark Hotel in Rosslyn, Virginia, just across the Potomac River from Washington, D.C.

All radio enthusiasts are welcome to attend this open, all band convention.

The ANARC meeting has become famous over the past few years for the appearance of several international broadcasting personalities, and ANARC expects to have more such luminaries on hand this year.

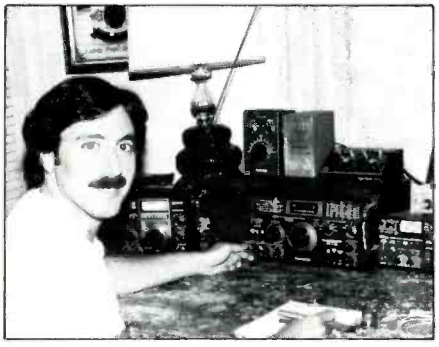
This year's schedule calls for the usual exhibits and displays by clubs, shortwave stations, and equipment manufacturers. There'll be seminars on such topics as publicizing radio listening, trends in broadcasting, equipment, and listening. You can learn about the use of computers in the listening hobby and attend sessions on DXing in its many forms—from longwave to utilities to shortwave broadcast. Also featured are a broadcaster's forum, informal visits with international shortwave station representatives, and an auction sponsored by the Handicapped Aid Program, in addition to the traditional Saturday night banquet.

The meetings and events run from Friday morning through Sunday afternon, July 15 through 17. The registration fee is $30, which includes the Saturday banquet. For more information, contact the Washington Area DX Association, 606 Forest Glen, Silver Springs, Maryland 20901.

The return of Radio Andorra? This station, along with medium wave Sud Radio, went off the air in March of 1981 after the Andorran government failed to renew the agreements under which both were operating. Now the government is reported to be setting up a new public broadcasting company which will lease transmitter facilities.

Sud Radio, at the time of its cancellation, moved its broadcasts to Southern France, while Radio Andorra simply closed down. It may be that we'll be hearing Andorra back on shortwave soon. Let's hope so!

Dan Nicholson of Colombia, Missouri, is still building his shack. This is it — "so far."



Ace DXer Steve Reinstein puts a variety of equipment to use in his Miramar, Florida listening post.

Speaking of Andorra brings to mind World Music Radio. This program service, based in Holland, was for a time aired regularly over Radio Andorra. So when that station closed down, World Music Radio had no place to go.

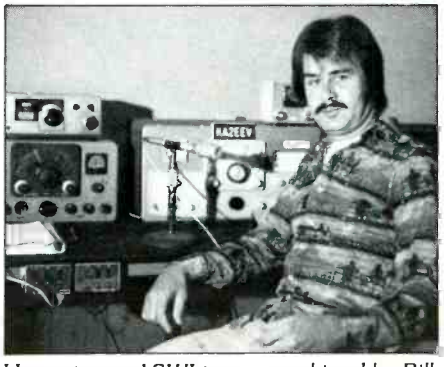
But early this year, an agreement was worked out with the unofficial Radio Milan International in Italy; World Music Radio went back on the air over the Milano facilities on FM locally and on a low powered shortwave transmitter on 6.221 MHz. The two organizations have now agreed to work together to expand the Radio Milan International operation. The power of the 6.221 outlet will be improved and an additional frequency of 11.569 MHz will be added along with an as yet undetermined spot in the 16 meter band.

If you hear any of the World Music Radio braodcasts over RMI, you can write to them at P.O. Box 4078 in Amsterdam, Holland.

Good news for those who've been unsuccessful in bagging the elusive Falkland Islands Broadcasting Station. FIBS now has an additional broadcast period beginning at 0900 GMT on 3.958 MHz that is being widely heard. The transmission begins with news from the BBC after the 0900 sign on, followed by a pop music program. Even with a better chance at reception, we'd still advise caution in chasing this one. Be sure you get plenty of program details and look out for ham radio QRM! For many years, the number of American DXers who had logged FIBS could literally be counted on the fingers of one hand!

There's another Radio Mediterranean. Recently, we told you about Radio Mediterranean in Malta over the Deutsche Welle relay transmitters there. Now there's one in Morocco. Radio Mediterranean International in Tangiers has been around for some time on long and medium wave, but now it's on shortwave too. It's been heard signing on in French at 0730 on 5.950 with interference from Radio Guyana on the same frequency. It's also using 15.260, 15.500, and 17.730, among others in the 2100 to 0000 time frame.

The skies darken over Radio New Zealand. An end-of-March deadline for shortwave operations was the most recent date set for closedown, so it could be gone by the time you read this. Radio New Zealand no longer has any program staff working on the shortwave side of the operation and all pro-



Hamming and SWLing, combined by Bill Wolf in Newark, New Jersey.

Shawn Jerin, of Tampa, Florida, is a CBer and SWL, using a Lafayette HT320 for his listening work.

gramming is simply a domestic service relay. Radio New Zealand's listeners on shortwave all hope for a "stay" and that something may eventually be worked out so this treasured station can continue to inform and entertain on shortwave.

What else is new? Well, Kenya's high power shortwave station is still under construction and it could be in operation any time now.

Radio France International's "Paris Calling Africa" program may be scheduled for a repeat daily broadcast of the hour long show, giving more people the opportunity to listen. Right now, it's scheduled at 1600 GMT or 11 a.m. on the east coast, which isn't the most opportune of times. We'll focus on Radio France International in an upcoming column.

A Difficult Dozen

Feel like a little challenge? Here are twelve tempting targets to try.

1. The Austrian Army Radio (Schulungssender das Osterreichischen Bundesheeres) now on a new frequency of 5.036 around 0930. They're using a new 10 kilowatt transmitter, a ten-fold increase in power over the old facilities.

2. Radio Cultura Antena Libre in Ecuador on 3.240. It'll be in Spanish and is occasionally heard in the 0100 to 0300 or 1100 GMT time slots.

3. ELBC from Liberia on 3.255. This one carries some English. Try it after 0600.

4. From Bolivia, Radio Abaroa sometimes puts in a pretty good signal on a variable frequency of 4.719 as late as 0300.

5. In Brazil, try Radio Nacional Tabatinga on 4.815; evenings around 0300 or mornings around 0900. Be careful, though. There are other Brazilians on the same frequency, including Radiodifusora Londrina.

6. You'll hear fascinating Andean music on Radio Andina, 4.996. Sometimes this runs into the wee hours of the morning as the station complies with listener music requests. Expect interference from WWV on 5.000.

7. Away from South America and over in the land of blarney, try the "sorta pirate" Radio Dublin on 6.910. 0300 onwards is probably the best time to log this one and east coasters will have the best shot.

8. Here's one of the many Chinese regional stations—Jiangxi People's Broadcasting Station from Nanchang on 5.020. Try it around 1200.

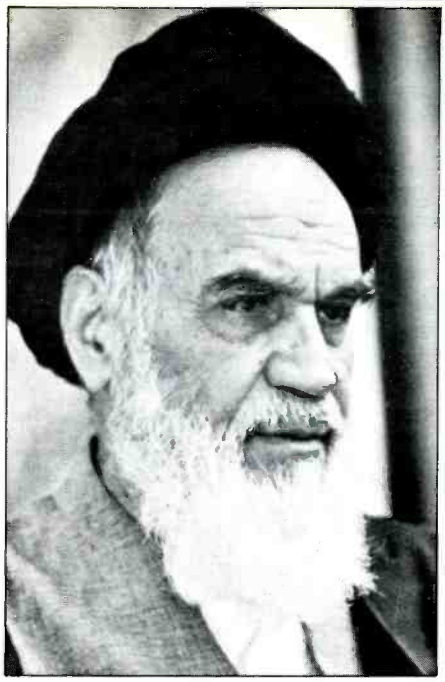
9. Into Africa and the Central African Republic on 5.035. Sign on, in French, is at 0430 and the signal can be quite good some days.

10. From the Caribbean, the Dominican Republic to be exact, have a go at Radio Santiago, just a hair below 6.050 local evenings or early mornings. It's all Spanish and you can figure on some hefty QRM.

11. From Lebanon, you can try for the King of Hope on 6.215, signing on at 0400. This one offers up religious programs and country music. Despite reports of higher power for this station, reception is still spotty and never really good, at least here in The Listening Post!

12. And, lastly, from Somalia, try Radio Mogadishu on 6.790, signing on at 0300 and off just after 0500. All in Somali and other local languages.

Dwell on these awhile and let us know how you do!



Do you recognize this fellow? He's on the front of card-style program/frequency schedule from the Voice of the Islamic Republic of Iran.

Mail Call

Darlene Slaughter from Warren, Pennsylvania has been listening on and off since she was 12; she recently acquired a DX-100 and is now listening more actively. She notes that Radio Netherlands is as charming and entertaining as ever and that Radio Moscow is as mildly irritating as ever!

Blake Pinnell of Lymington, Hants, England discovered *POP' COMM* on a business trip to New York. He likes the mag very much and has a complaint about his lack of replies to reports sent to the likes of Taiwan, Hanoi, Teheran, Jerusalem, Cairo, and Nigeria. These are all pretty good verifiers, Blake, so give them a little more time. Hanoi, in particular, is quite slow in responding. And, there's always the mail to blame, too! You'll find repeat reports (or follow-ups) are very often necessary if you're going to get into QSLing stations.

Bill Wolf of Newark, New Jersey is another of our ham operators who's also a shortwave listener and kindly sends a photo of his operation. He's KA2EEV.

Dan Nicholson, also a ham (KAØ PPO) in Colombia, Missouri, also sent a photo of his shack. We appreciate those shack pictures!

John D. Caudill of Greenup, Kentucky got into listening as a result of reading *POP' COMM!* John says it's by far the most entertaining hobby he's found yet. And we bet it'll be mighty hard to top too, John!

Joe Greegan of Hamlin, Pennsylvania wonders about the vintage of the Hallicrafters S-120 receiver and whether it's possible to hook up digital readout to this unit. The S-120 dates back to the early 1960's. To our knowledge, there are no digital readout units which would work with this receiver.

Ralph Larson, Sr., of Hector, Minnesota uses a 25-year-old Zenith Transoceanic, but plans to upgrade soon. We have to say again that we cannot make recommendations on which receiver to purchase. What's right for one person may be all wrong for someone else. Ralph also wonders about a broadcast he heard from Libya and what city they were mentioning. The SPLAJB broadcast from Tripoli, Ralph. The city references you heard may have been to "El Beida."

V.J. Anyzeski of East Haven, Connecticut wonders about sending reception reports to, and getting replies from, The Iron Curtain countries. Is there a chance these letters might be intercepted and read either here or there? Well, ye ed had a couple of letters from Radio Moscow intercepted and the envelopes photocopied by the CIA many years back when the cloak and dagger boys were running some sort of mail monitoring project. But don't let that scare you off. To our knowledge, that was the only case involving a DXer and we know of no problems in that line today (other than perhaps a suspicious glance now and then from your mailman)! Of course, no one can say what happens to the letters "over there."

Dennis Burnstein in Arlington, Massachusetts mentions the Voice of Peace, which broadcasts from a ship in the Middle East. Unfortunately, Dennis, it's medium wave only, although it's been said from time to time to be planning to add shortwave. The station has also talked about closing down completely and we don't have any recent information about its status.

A nice crop of letters and photos this month and if you haven't written yet—then it's your turn next month! Let us have your comments, opinions, questions, photos of you and your shack, good photos, or copies of your more interesting QSLs. And, certainly, reports on what you're hearing on the bands as well! Please include some information other than date, time, and frequency, though. We'll be looking for your letter!

What's On

Here's what's on. Remember, all days and times are Greenwich Mean Time.

Albania Radio Tirana on 9.375 in an unidentified European language was noted at 0515 with man and woman in commentary. (Mackenzie, CA)

Antarctica Radio Nacional Archangel San Gabriel (RNASG) heard in Spanish at 2350 to 0026 on 15.474 with music, comments by woman to sign off with martial music at 0026. (Mackenzie, CA)

Antigua The Voice of Germany relay from this Caribbean island logged on 9.545 at 0535 in English to sign off at 0550. (Mackenzie, CA)

Argentina Radiodifusora Argentina al

John Palumbo of Windber, Pennsylvania, works at this DX-200 receiver.

Exterior (RAE) from Buenos Aires in English on 11.710 at 0430 with frequency announcements, news, commentary, and music to 0500. Operating in parallel on 9.690. (Mackenzie, CA)

Ascension Island The BBC Relay Station was heard at 0400 on 7.105 with a transmitter location identification. Considerable interference from amateur radio operators on that frequency. (Homuth, AZ)

Australia Radio Australia heard at 1815 in English on 11.720; also at 0445 in English on 15.320. (Mackenzie, CA)

Brazil Radiobras on 17.720 noted in Portuguese and German. Religious, then classical piano music and identification in German. (Mackenzie, CA)

Canada Radio Canada International has an out-of-band transmission on 23.440 at 2200, which was heard at medium strength. (Homuth, AZ)

China Radio Beijing logged at 0420 in Chinese on 11.975, a frequency move from 11.980. (Mackenzie, CA)

Dominican Republic Radio Clarin, 11.700 heard in Spanish with music up to their identification at 2300. (Mackenzie, CA)

East Germany Radio Berlin International noted in English at 0400 on 9.560 with news, music, and commentary. Switched into German at 0415. (Mackenzie, CA)

Gabon The powerful Africa Number One noted at 0500 sign on in French on 4.811. Program began with a man reading the news; also noted on 11.940. A better DX target is La Voix de la Renovation from Libreville heard at 0440 in French on 4.777. (Mackenzie, CA)

Grenada Radio Free Grenada heard on 15.045 in English at 2330 with advertisements, time checks, and music. (Mackenzie, CA)

Honduras HRVC, La Voz Evangelica noted in Spanish at 0450 on 4.820. Signed off with a hymn at 0459. (Mackenzie, CA)

Israel The Voice of Israel has English at 1200 to 1300, 1400 to 1530, and 1630 to 1745 on 21.670; 1200 to 1300 on 21.625; 1530 to 1630 on 17.815; 1200 to 1300, 1530 to 1630 on 17.630; 0530 to 0600, 1000 to 1030, 1200 to 1300, 2000 to 2100, and 2200 to 2330 on 15.585; 0500 to 0530, 1745 to 2300 on 15.105; 0000 to 0130, 0200 to 0230, 2000 to 2100, and 2200 to 2330 on 11.655; 0500 to 0530 on 11.637; 1530 to 1630 on 11.610; 0000 to 0130, 0200 to 0230, 0500 to 0530, 2000 to 2100, and 2200 to 2330 on 9.815; 0500 to 0530 on 9.440; and 0000 to 0130, 0200 to 0230, and 1730 to 1800 on 7.410. (Lawrence Magne, International Broadcasting Services Ltd., PA)

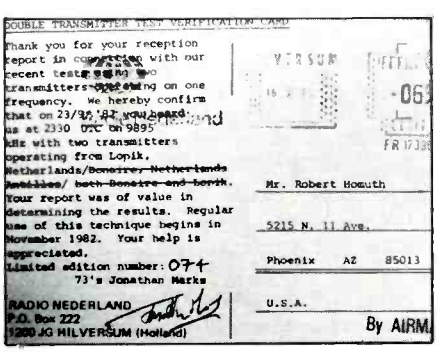
Italy RAI from Rome caught on 9.575 at 0100 to 0120 in English with news, pop music, and then into French beamed at Canada. (Mackenzie, CA)

Japan Radio Japan's English programs to America are scheduled from 0100 to 0130, 0300 to 0330 on 17.755; 0500 to 0530, 0700 to 0715 on 15.325; 0900 to 0930, 1100 to 1130 on 9.505; 0100 to 0145, 0300 to 0345 on 9.505; 0500 to 0530 also on 9.505; then 0700 to 0745, 0900 to 0930, 1015 to 1030, and 1100 to 1130 on 17.755. (Slaughter, PA) Nihon Shortwave Broadcasting Co. from Tokyo noted in Japanese with a sports event at 0555 on 9.595, and Radio Japan in English with news, commentary, and Asian news at 0130 to 0230 on 17.825. (Mackenzie, CA)

Kuwait Radio Kuwait was logged at 0425 on 9.880 in Arabic with man and woman in press review program followed by Arabic music. (Mackenzie, CA)

Liberia The Voice of America Relay station at Monrovia was heard with the "African Safari" program at 0350 on 11.835. (Mackenzie, CA)

Lithuanian SSR (USSR) Radio Vilnius was heard with good reception at 2215 on 17.870. (Proske, PA) Unfortunately, Radio Vilnius is aired exclusively on shortwave



DOUBLE TRANSMITTER TEST VERIFICATION CARD

Thank you for your reception report in connection with our recent tests [illegible] two transmitters operating on one frequency. We hereby confirm that on 23/[illegible]/82 you heard us at 2330 UTC on 9895 kHz with two transmitters operating from Lopik, Netherlands/Bonaire, Netherlands Antilles/ both Bonaire and Lopik. Your report was of value in determining the results. Regular use of this technique begins in November 1982. Your help is appreciated.

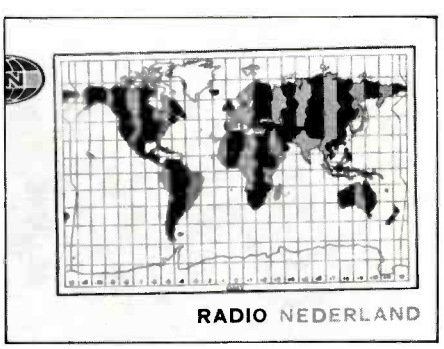
Limited edition number: 074

73's Jonathan Marks

RADIO NEDERLAND
P.O. Box 222
1200 JG HILVERSUM (Holland)

Mr. Robert Homuth
5215 N. 11 Ave.
Phoenix AZ 85013
U.S.A.

By AIRM



Robert Homuth in Phoenix, Arizona likes the special QSL he received from Radio Netherlands for their experimental transmission using two transmitters at the Lopik site at the same time.

This QSL card from Trans World Radio shows their broadcasting sites and belongs to Charles Ames in Arizona.

over the transmitters of Radio Moscow. (Editor)

Marianas Islands KYOI, Saipan noted with rock and pop music from 1535 tune in one day and other days as late as past 1800 all on 9.670. (Osier, NY) On 15.190 with identification in English at 0454 "This is Superock-KYOI, Saipan;" also using Japanese; also heard on 9.670 at 1815. (Mackenzie, CA)

Namibia The Southwest Africa Broadcasting Corporation was tentatively heard on 3.270 at 0518 in an unknown language. Interference from a "utility" station. (Mackenzie, CA)

Netherlands Radio Netherlands in Arabic on 9.895 at 1645. (Mackenzie, CA) Radio Netherlands is on the air in English to Eastern North America from its Bonaire site in the Caribbean from 0230 to 0325 on 9.590 and 6.165; and on 6.156 and 9.715 from 0530 to 0625 to Western North America. (Slaughter, PA)

Netherlands Antilles Radio Netherlands from Bonaire heard with the "Happy Station" program on 21.685 at 2030 to 2120; also heard on 17.695 and 15.560 from Bonaire and on 15.220 from the Madagascar relay station. (Mackenzie, CA)

New Zealand Radio New Zealand heard with a sportscast on 17.705 at 0420 in parallel with 15.485. (Mackenzie, CA)

North Korea Radio Pyongyang was logged in English at 1640 on 9.977 with identification at 1643. (Mackenzie, CA)

Nigeria The Voice of Nigeria's West African Service is heard at extremely strong levels on 7.255 from its sign on at 0500. However, the transmitter modulation is somewhat distorted and there's interference from Radio Moscow outlets on 7.250 and 7.260. (Homuth, AZ) Radio Nigeria from Kaduna logged on 4.770 in English at 0545 with a talk about the Nigerian House of Representatives. (Mackenzie, CA)

Philippines The Voice of America relay station on 9.760 heard at 1650 with the "Music USA" program to sign off at 1700; on 9.575 with the "Sound of Soul" at 1810. Radio Veritas Asia heard on 15.195 in English at 0000, mixing with Radio Japan on the same frequency. (Mackenzie, CA)

Singapore The BBC Far East Relay station has been observed on 9.740 with news and the program "Meridian" at 1700. (Mackenzie, CA)

South Africa Radio RSA broadcasts to the USA and Canada in English from 0200 to 0257 on 15.325, 11.900, 9.615, and 5.980. (Slaughter, PA)

Spain Radio Exterior de Espana (REE) Madrid has English from 0000 to 0200 on 9.630 and 11.880; from 0530 to 0630 on 9.630; 1900 to 2000 on 9.675 and 11.840; and from 2000 to 2100 on 11.760 and 15.375. (Slaughter, PA) REE in Spanish with pop music on 9.360 at 0535; 11.760 in English at 2130 to 2200 sign off; at 0050 to 0100 on 11.880 and on 15.375 in English from 2000 to 2100. (Mackenzie, CA)

Sri Lanka The Sri Lanka Broadcasting Corporation was heard in Hindu on 9.720 from 1710 to 1732 sign off with their national anthem. The Voice of America Sri Lanka relay heard on 9.645 at 1735 with news in special English followed by a science report. (Mackenzie, CA)

Switzerland Radio Switzerland International observed at 0425 on 11.715 with interval signal and the sign on in English at 0430. (Mackenzie, CA)

Sweden Radio Sweden International is scheduled to North America at 0230 on 9.695 and 11.705; also at 1400 on 21.615; and at 2300 on 9.695 and 11.705. (Slaughter, PA)

Taiwan The Voice of Free China heard with a broadcast in Mandarin on 15.225 at 0045 to 0100, followed by anthem and sign off. (Mackenzie, CA)

United States The Voice of America's Greenville, North Carolina transmitter was noted in single sideband mode on 19.262. The VOA also uses 19.480 in AM. (Homuth, AZ)

USSR Radio Moscow's home service program via Magadan noted in Russian at 0530 on 9.500; and heard in Spanish, via the site at Nikolaev, on 9.490 at 0400. (Mackenzie, CA)

Vatican Transmissions in English from Vatican Radio are at 0100 on 6.015, 9.605, and 11.845; at 1115 on 17.840, 21.485; at 1200 on the same two frequencies. Also at 1600 on 11.810, 15.120, and 17.730; 2045 on 9.625, 11.700, and 15.120; 0200 on 7.125, 9.605, and 11.965. Weekdays only at 1500 on 11.810, 15.110, and 17.865 and at 2210 on 9.615, 11.830, and 15.120. (Slaughter, PA)

Venezuela Radio Reloj Continente was heard with local ads and an identification on the hour at 0300 on 5.030. (Homuth, AZ)

Our thanks to: Lawrence Magne, International Broadcasting Services, Ltd., Penns Park, Pennsylvania; George Osier, Norfolk, New York; Michael J. Proske, Ridgeway, Pennsylvania; Robert C. Homuth, Phoenix, Arizona; Stewart Mackenzie, Huntington Beach, California; Shawn Jerin, Tampa, Florida; Dennis Bernstein, Arlington, Massachusetts; V.J. Anyzeski, East Haven, Connecticut; Robert Larson, Senior, Hector, Minnesota; Joe Creegan, Hamlin, Pennsylvania; John D. Caudill, Greenup, Kentucky; Dan Nicholson, Colombia, Missouri; Bill Wolf, Newark, New Jersey; Blake Pinnell, Lymington, Hants, England; and Darlene Slaughter, Warren, Pennsylvania.

See you next month!

SCANNER SCENE

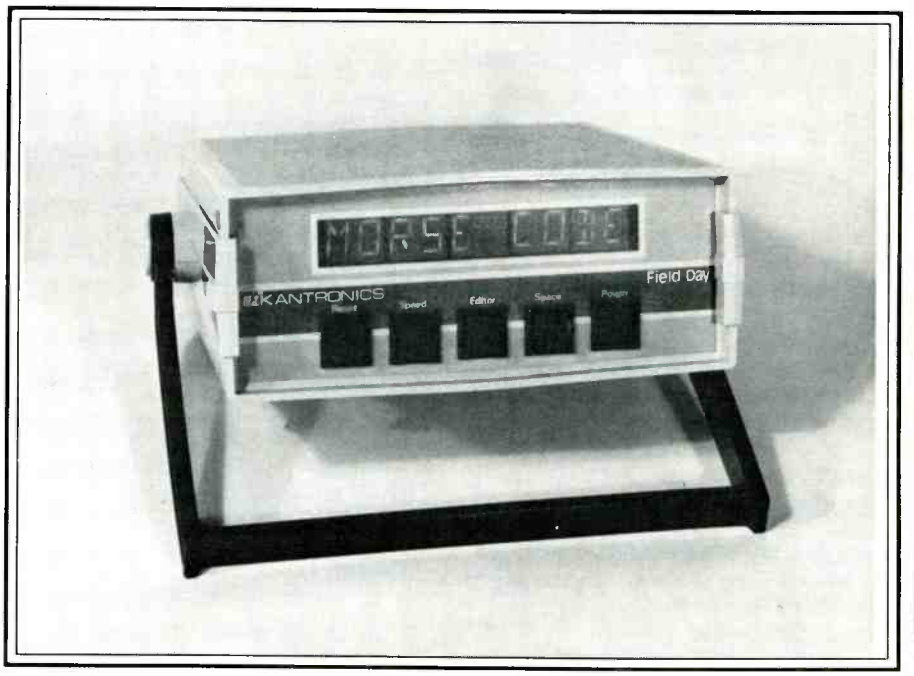
BY CHUCK GYSI, N2DUP

MONITORING THE 30 TO 512 MHz "ACTION" BANDS

One radio service that is almost as much fun as listening to mobile telephone calls is the amateur radio bands. In many areas, ham radio repeaters are not much more than a great big party line, with any and all hams chiming in with their two cents worth.

The amateur radio service is a self-disciplined hobby and licensees must demonstrate not only the ability to receive Morse code (known as CW for continuous wave), but also need to be proficient in radio theory, electronics, FCC rules and regulations, and operating procedures. There are five classes of amateur radio licenses, with operating privileges progressing with higher licenses.

The basic beginner's license is the novice license. Operators of this class must be able to receive Morse code at a rate of five words per minute and take a simple 20 question, multiple choice exam. These exams are administered only by hams who have at least a general class ticket, not the FCC. Novices are allowed to operate only CW with a power of 250 watts maximum in selected portions of four shortwave—or high-frequency (HF)—bands.



The next progression is to the technician class license. Technician class licensees have passed a 50 question, multiple choice exam by the FCC. They retain their novice operating privileges on HF, but also can operate in any mode on any band above 50 MHz. Each of the higher classes of licenses affords the availability of additional frequencies in the HF spectrum. General class licensees must pass a 13 word-per-minute exam, advanced class licensees must pass a 50 question, multiple choice exam, and extra class licensees must pass a 20 word-per-minute code exam and a 40 question, multiple choice written exam.

In any event, the bands scanner users are interested in listening to are: 50-54 MHz, 144-148 MHz, and 420-450 MHz. Some scanners might be capable of listening in on the 29.3-29.7 MHz FM band and with a converter or conversion, you could listen in on even the 220-225 MHz band. The best bet, however, is the 144-148 MHz band. This is where most amateur activity takes place in the VHF/UHF spectrum. Even hams who have operated only on HF for many years are discovering the fun of operating through repeaters on the 144-148 MHz band, also known as 2 meters.

If you've never eavesdropped on any of the ham channels, here's where to begin. Try scanning 145.100-145.500, 146.400-146.505, and 146.610-147.390. These are the standard repeater outputs on the 2 meter band. Repeater stations are usually located on mountain tops or at high elevations and receive transmissions on one frequency and rebroadcast those signals on another frequency (usually 400 kHz higher or lower). This enables mobiles and hand-held units to be able to communicate over much greater distances. Repeaters usually are owned either by amateur radio clubs or by individual hams. Not only are there the initial costs of putting a repeater station on the air, but also the monthly costs such as electric, telephone lines, and tower space rental. Thus, many clubs have membership dues to cover these costs.

Most repeaters are considered "open." This means that anyone can use the repeater to contact other hams. However, there are some "closed" repeaters. That means that only club members or selected friends of the repeater's owner can use the repeater. To prevent others from accessing the repeater, typically a continuous tone coded squelch system (CTCSS) is used. CTCSS, also known by the trade names of Channel Guard, Private Line, or Quiet Channel, is a sub-audible tone that your transceiver transmits and is performed by installing a special device in the radio. The repeater employing CTCSS will not retransmit any signals unless it "hears" the sub-audible CTCSS tone. Other methods of keeping unauthorized persons off repeaters include using tone burst, Touch-Tone codes, or even manual on-off switching by the repeater control operator.

Many repeaters operated by clubs and individuals have special features that can be accessed by authorized users. Through the use of Touch-Tone pads on radios, some repeaters can be linked to HF bands. By accessing certain codes, a ham can link an HF transceiver to a 2 meter repeater and then proceed to select his frequency, power, and antenna direction. Theoretically, the ham could be sitting in his living room with a handie-talkie and could be communicating via the HF link to a far-away country. Other repeaters may have links with other bands, such as 220 or 440 MHz. Some repeaters have tapes that can be accessed by Touch-Tone to offer other hams information about the "machine," as repeaters typically are called.

But perhaps the most popular feature on many amateur repeaters is the ability to place landline telephone calls by radio. Many repeaters either have closed or open autopatch capability. Closed autopatch means that only club members or authorized users may use the phone patch to make telephone calls. Open patch means that anyone may access the system. In most open systems, the dial tone is accessed by the amateur by depressing the * key on the Touch-Tone pad on his or her radio for a second or two. The dial tone then can be heard and the ham dials his or her telephone number and the call is connected. To disconnect the call, the # key is depressed.

As a security feature on some repeaters, the repeater's output will go off the air when the ham is dialing the telephone number so no one can hear the number being called. On repeaters that have a closed autopatch,

several digits, usually three to five, must be accessed to bring up a dial tone on the repeater. Some repeaters' outputs also shut off when the access codes are being transmitted so unauthorized users cannot figure out the codes by listening to the codes.

You'll often hear hams making autopatch calls to tell their wives or girlfriends (or husbands) that they'll be late for dinner because of traffic or to find out whether they need to stop and pick up an item. But the most important aspect of autopatching is for emergency service. Law enforcement agencies and emergency assistance can be procured just by dialing a telephone number. Some repeaters even have direct lines to police and the ham need only dial a code such as 911 on the Touch-Tone pad to get quick assistance. Autopatching can prove invaluable in emergency situations.

Some repeaters also have reverse autopatch capability. Because there is a phone line at the repeater, if the phone number is dialed, some repeaters will continually transmit a signal in Morse code to indicate the phone is "ringing." Any ham with the proper access code can then "answer" the call and direct it to the proper ham. Not only does it make it easy for wife to reach husband while he is in the car (or vice versa), but it enables emergency agencies to get additional information from ham operators in an emergency situation.

As you listen to the repeaters in your area, you'll hear other features, such as "talking clocks," paging, and voice synthesis.

Although protocol on the HF bands is to call CQ—a general call to contact other hams—on 2 meters and other VHF/UHF bands, a ham wishing to establish contact will simply say: "This is N2DUP listening." Hams are required to identify their call sign every ten minutes and during a conversation, you might hear something like: "WA2CVK and the group, this is N2DUP." Because the ham might be communicating with several other hams all at the same time, it's necessary only to identify one of the other call signs and your own. Thus, "the group" is used to identify all the other hams. To break in on a conversation, a ham might say "break," but typically will just say his or her call sign.

In addition to repeater operation, many hams operate simplex. Simplex operation is talking on just one frequency and not through a repeater. When two hams are close to each other, instead of typing up a repeater channel, they will talk simplex to each other on the repeater output channel or perhaps switch to a channel allocated for simplex use.

The American Radio Relay League, a group that represents slightly more than half the amateur radio operators in the United States, has set up band plans for each of the VHF and UHF ham bands so different types of operation are confined to certain frequencies. The chart accompanying this article details what type of operation hams can carry out on each of the different frequencies. Although the FCC pretty much allows any type of operation within the band limits, as a matter of courtesy, amateurs will restrict their operations according to the ARRL plan to eliminate possible interference to hams operating in other modes.

You'll note on the list that there are frequencies allocated for Morse code, single-sideband, moonbounce (in which hams bounce their signals off the moon to other hams), and satellites (OSCAR). Try listening in on the frequencies and get to know some of the local hams who are people just like you chatting with other hams each day. Better yet, the ham radio bug might bite you and you might want to get a ham license. Contact any ham for details on how to join one of the world's greatest fraternities.

Mailbag

Mark A. Pagel of Coeur d'Alene, Idaho, writes in to ask whether it is legal for someone to modify his scanner to cover out of band frequencies, particularly the 72-76, 225-400, and 400-420 MHz bands. Well, it's legal to make any modification you desire to the scanner; the only restrictions the FCC imposes is on transmitters. Another thought is to at least wait until the warranty expires on the scanner, or the manufacturer might refuse to make any repairs if the set has been modified. One outfit that does make modifications to scanners is RMA Electronics Co., 32 Mountain Home Road, Londonderry, NH 03053, (603)432-4158. They currently are in the process of marketing a 225-400 MHz AM scanner that looks like a Bearcat 20/20. They also will modify Bearcat 220s or Bearcat 20/20s for monitoring this band. They'll also realign scanners for out-of-band coverage. Write or call them for further details. In a future column, we'll discuss how to receive out-of-band frequencies by using programming tricks or making minor modifications.

ARRL Band Plans

29.300-29.700 MHz	
29.300-29.500	Amateur radio satellites
29.520-29.580	Repeater inputs (20 kHz spacing)
29.600	Simplex
29.620-29.680	Repeater outputs (20 kHz spacing)
50-54 MHz	
50.000-50.080	CW and beacons
50.080-50.100	CW
50.100-50.500	CW, SSB, AM
50.200	National calling frequency
50.500-54.000	FM and FM repeaters
52.490, 52.510	Simplex
52.525	National simplex frequency
53.1, 53.2, 53.3, 53.4, 53.5	Radio control
144-148 MHz	
144.000-144.050	Moonbounce CW
144.050-144.060	Propagation beacons
144.060-144.100	CW and low power
144.100-144.200	Moonbounce and low power SSB
144.200	National calling frequency
144.200-144.300	SSB
144.300-144.500	New OSCAR satellite sub-band
144.500-144.600	Linear translator inputs
144.600-144.900	FM repeater inputs for 145.2-145.5
144.900-145.100	Low power and FM simplex
145.100-145.200	Linear translator outputs
145.200-145.500	FM repeater outputs for 144.6-144.9
145.500-145.800	Miscellaneous and experimental
145.800-146.000	OSCAR satellite sub-band
146.010-146.385	Repeater inputs for 146.61-146.985
146.400-146.490	Repeater outputs for 147.4-147.49
146.400-146.600	Simplex
146.520	National simplex frequency
146.610-146.985	Repeater outputs for 146.01-146.385 (15 kHz channel spacing)
147.000-147.390	Repeater outputs for 147.6-147.99 (15 kHz channel spacing)
147.400-147.490	Repeater inputs for 146.4-146.49
147.420-147.570	Simplex
420-450 MHz	
420.000-426.000	Amateur television repeater or simplex (421.250 video carrier), control links, experimental
426.000-432.000	Amateur television simplex (427.250 video carrier frequency)
432.000-432.070	Moonbounce
432.070-432.080	Propagation beacons
432.080-432.100	Low power CW
432.100	Calling frequency
432.100-432.125	Miscellaneous and low power
432.125-432.175	OSCAR satellite inputs
432.175-433.000	Miscellaneous and low power
433.000-435.000	Auxiliary and repeater links
435.000-438.000	Satellites only (international)
438.000-444.000	Amateur television repeater inputs (439.250 video carrier) and repeater links
442.000-445.000	Repeater inputs and outputs
445.000-447.000	Auxiliary and control links, repeaters and simplex
446.000	National simplex frequency
447.000-449.990	Repeater inputs and outputs (50 kHz channel spacing)

A Non-Electronic Transmitter

Built From A Doorbell Buzzer And Some Scrap Parts – It Was A Winner In 1922

BY ANSON MacFARLAND, KVA4EX

Back in the early days of radio, the spark gap (also known as "damped wave") transmitter was in vogue. Essentially, this was a device consisting of two metal points, tips, or balls separated by a small air gap. A high voltage applied to the electrodes caused a spark (or in the case of an AC voltage, a train of sparks) to jump across the gap. Different refinements of this technique were known as quenched spark gaps, rotary spark gaps, and synchronous spark gaps. The arcing spark would propagate a short range radio signal over a wide band of frequencies—similar in many ways to the radio noise given off by a vacuum cleaner or hair dryer.

At some point in the early evolution of the discovery that a spark would produce a sound in a radio receiver, someone decided that by turning the spark on and off at spaced intervals, Morse code might be sent. The next step in the development of the idea was to extend the range of the signal sent out by the spark. This was accomplished by attaching an antenna (or aerial, as they were known then) to the device. In an attempt to narrow down the enormous bandwidth of this signal, it was eventually decided to try to peak the signal in one frequency range (and therefore reduce it in others) by means of a resonant circuit consisting of a coil and a capacitor—although (by modern standards) the signal still came out over a broad frequency range.

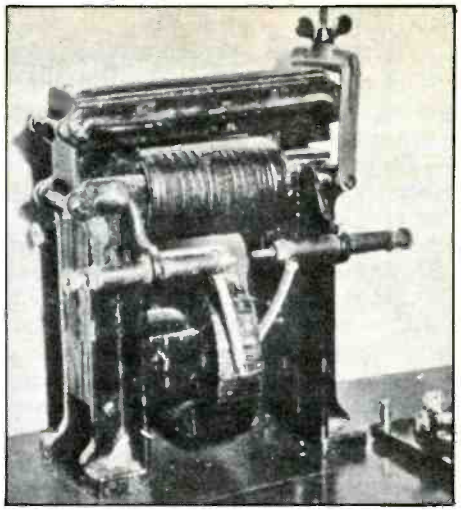
When more efficient methods of sending messages were developed, the spark gap became obsolete. It produced a raspy note, and as the frequencies became more and more populated with stations, there just wasn't a sufficient amount of radio spectrum to tolerate these broad spectrum signals. It wasn't even legal to operate a spark gap transmitter in most nations after the years went by.

All in all, the spark gap transmitter was more a piece of electrical apparatus than a piece of electronics. It required no tubes at all and could be constructed from scraps of assorted junk one might find lying around a garage or workshop. To give you some idea of the workings of one of these devices, I scouted around for a basic circuit—and in a dusty 1922 military manual on improvised communications, I found just what I was seeking. Here was a radio transmitter that could be assembled in a jiffy. Also included in the instructions was a simple receiver that I have not included here, but may run at some time in the future if there is sufficient interest.

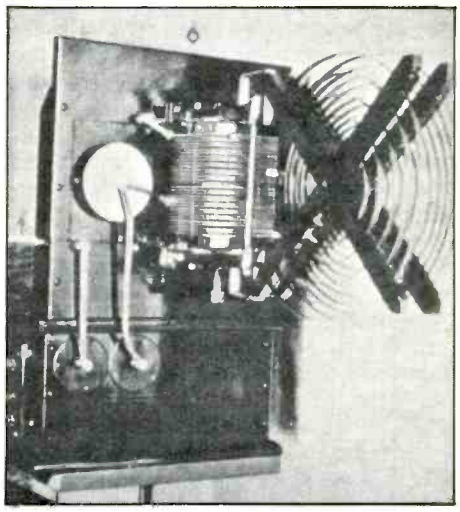
I'm not presenting this with the suggestion that anybody actually build the transmitter. I haven't built it myself and can't offer any more insight into its performance on the air, although I would assume that it would not be possible to operate this legally. Its operation would raise an awful ruckus and generate lots of interference on all frequencies between the AM broadcast band right on upwards through the UHF TV channels.

The frame for the "aerial" (antenna) was made from two sticks, each four feet in length. On these were wound three strands of #14 bell wire, making a large loop. The next ingredient was a "good door buzzer" rigged up with a circuit that has a telegraph key or push-button. The instructions said that if there was a rheostat in series with the circuit it would operate "much better." For the uninitiated, a rheostat is a variable dropping resistor usually of the rotary type but more often of the long slider type. In this circuit, it was suggested that the rheostat be homebrewed from a screen-door spring nailed to a board "in such a way that it is somewhat stretched." One wire from the battery is fastened to one end, and on the wire to the loop is attached a paper clip. The clip, it was noted, "can be set at any point along the spring, thus offering greater or less resistance in the circuit and making it possible for the buzzer to give its peak of sound."

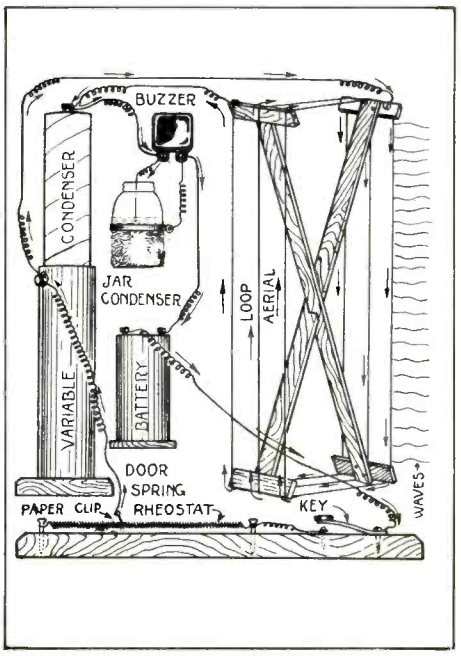
Next comes the variable condenser (or capacitor). It was suggested that this be "quickly and easily made from two lengths of stove or round gutter pipe. One pipe must fit smoothly inside the other." The inner pipe was to be covered with a layer of paper and shellac and allowed to slide in and out of the larger pipe. This is what peaks up the transmitter and matches it to the antenna for maximum output. As the smaller pipe was pulled out, the ability of the capacitor to "hold electricity" was decreased. As it was pushed in, the ability was increased. At some point during this operation, the operator will find that "the aerial sends the clearest



Famous Thordarson 1 KW transformer of spark days produced 20,000 volts, and was a lethal weapon. It was the demon that "busted up" early entertainment broadcasts.



Amateur operators of 1916 used equipment of this kind. Spark transmitters were inefficient, disrupted military and commercial radio, and were declared unlawful.



note of all." The variable capacitor was then set across the wires leading to the aerial and a "fruit jar condenser" was put across the buzzer binding posts. The jar condenser was made by coating a fruit jar on the outside with tin foil and filling it to an equal height on the inside with plain water. One wire reaches through the cap into the water while the other was fastened to the tin foil.

Surprisingly enough, this completed the transmitter, which would then send out code signals whenever the key or button was depressed. I've tried to use as much of the original quaint language as possible, although it would certainly have been of more valuable use had the designers of the circuit given some specific values for the rheostat and the capacitors, or some indication as to the general frequency range where the signals were expected to peak. I have also reproduced here the original wiring diagram just as it appeared in the 1922 instructions.

What recalled all of this and brought it to the forefront of my mind was a letter I received from a reader in Kansas City, Kansas. He said that by making a short antenna out of a paper clip and attaching it to one side of an old doorbell buzzer, he found that he could send code that could be received on his car's radar detector! He wanted to know if he had invented something new in the way of microwave communications.

Is it new? Hardly. Illegal? Yup!

SATELLITE VIEW

INSIDE THE WORLD OF TVRO EARTH STATIONS

BY MARK LONG, WA4LXC

The World At 12 Gigahertz

Far above the 3.7 to 4.2 GHz frequencies now used by more than 15 North American satellites, there is a new frontier developing—the frontier of 12 GHz. At present, these higher frequencies are primarily being used for the relay of business communications. But by the second half of the decade, new Ku-band satellites operating in the 11.7 to 12.2 GHz range should rival our present C-Band birds in their ability to deliver hundreds of channels of television, voice, and data services throughout North America.

Anik B

Canada's Anik B, the world's first commercial dual-band 4/12 GHz satellite, was originally launched in December, 1978. Anik B's Ku-Band transponders derived a medium power signal from 20 watt traveling wave tube amplifiers (TWTA's). On-board, spot beam antennas serve the four major regions of Canada. The successful results of Anik B's direct satellite-to-home broadcast pilot project, conducted by The Canadian Department of Communications, attracted considerable interest in the U.S. and elsewhere. Anik B is still in service today; plans call for its replacement by a newer satellite sometime in 1984.

Satellite Business Systems (SBS)

Satellite Business Systems (SBS) is a partnership formed in 1975 by COMSAT, IBM, and Aetna Life to provide fully switched, integrated, broadband telecommunications services to domestic business and government organizations. Today's SBS satellites transmit all forms of business communications—voice, data, and image—through a single integrated network. For example, SBS customers now relay computer data at speeds of several million bits of information per second, send mail electronically, carry on telephone conversations, and conduct video teleconferences, all at a cost much lower than what was previously possible.

SBS customers are involved in uplinking as well as downlinking. The 12 GHz frequencies are more versatile than 4 GHz for business use, since there are few competing terrestrial microwave services sharing the same band, as is the case with our 4 GHz satellites. In urban locations, this is an essential prerequisite for interference-free operation.

North American Ku-Band Satellites

Satellite	Launch Date	Position	Notes
Anik B	Dec. 1978	109 West	4/12 GHZ*
SBS-1	Nov. 1980	100 West	
SBS-2	Sept. 1981	97 West	
Anik C3	Nov. 1982	112.5 West	Canada
SBS-3	Nov. 1982	94 West	
Anik C2	May, 1983	116 West	Canada
SpaceNet I	Feb. 1984	119 West	4/12 GHz*
Adv. Westar	Feb. 1984	79 West	NASA TDRSS
Anik C1	April, 1984	109 West	Canada
GSTAR 1	May, 1984	103 West	
SpaceNet II	July, 1984	70 West	4/12 GHz*
GSTAR 2	August, 1984	106 West	
Westar IX	April, 1985	91 West	
Satcom K1	May, 1985	83 West	
SpaceNet III	June, 1985	?	4/12 GHz*
Satcom K2	August, 1985	?	
Westar X	Nov. 1985	?	
Westar XI	April, 1986	?	
Ford Aerospace-I	1987	?	4/12 GHz*
Ford Aerospace-II	1987	?	4/12 GHz*
Satcom K3	Oct. 1987	?	

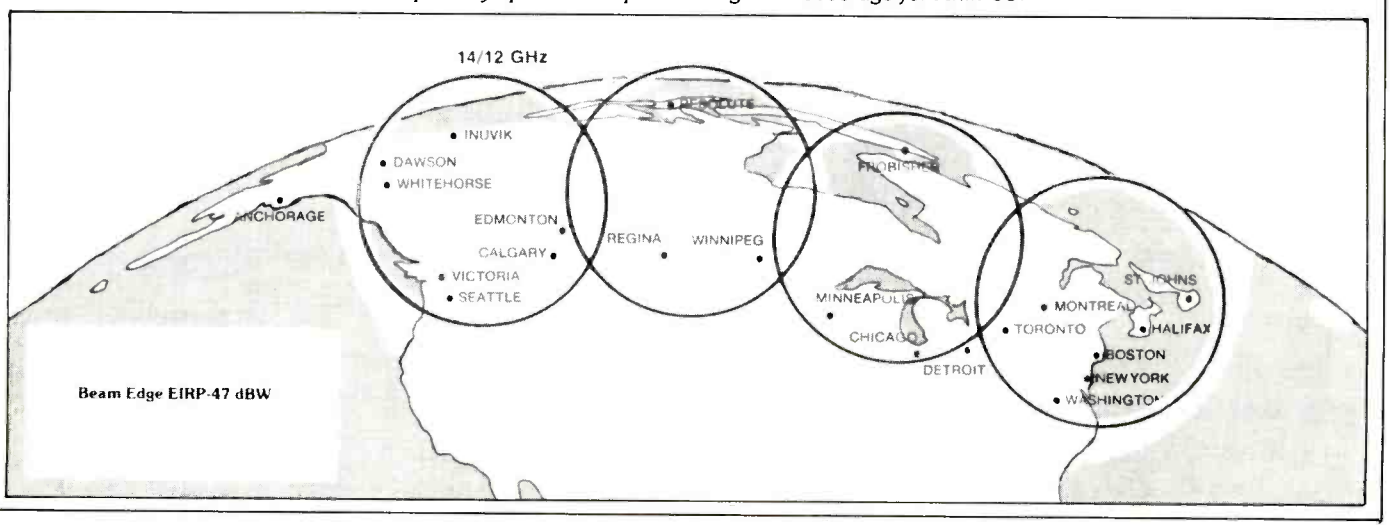
* Dual-Band satellites

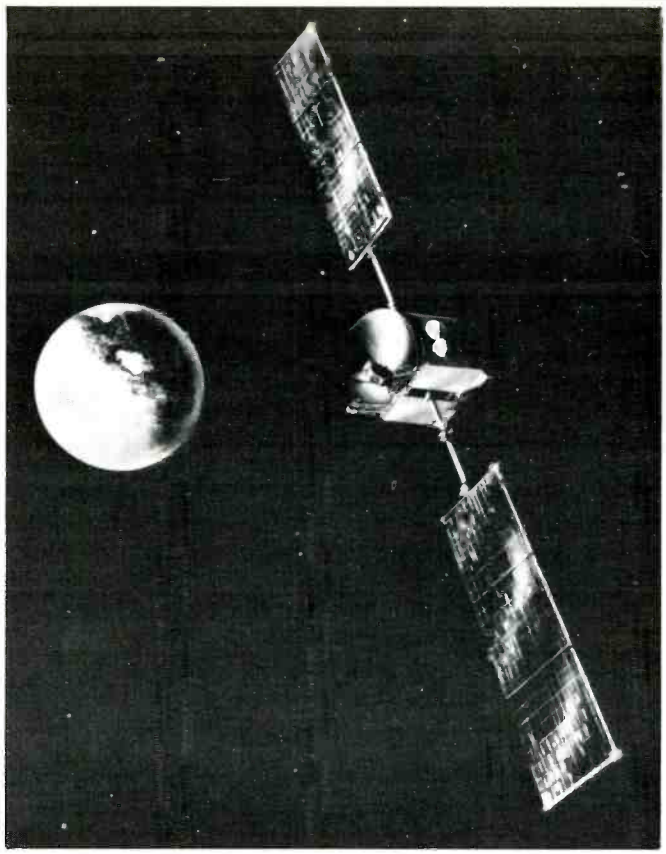
DBS And The Ku-Band

The use of Ku-Band frequencies provide major reductions in dish sizes for both uplink and downlink stations. This is brought about because a 12 GHz signal has a wavelength ⅓ that of a 4 GHz one, giving a 2 foot dish the equivalent gain of a 6 footer when the higher frequency band is used. Manufacturing tolerances have to be much more exact than what would suffice at the 4 GHz frequencies, however.

The shrinkage in dish size has made Ku-Band birds more attractive to program services wanting to enter the private home

Four primary spot beams provide regional coverage for Anik C3.





SpaceNet satellite. Photo courtesy of RCA Astro Electronics.

Anik C3. Photo courtesy of Telesat, Canada.

directly, thereby eliminating the cable middle man. The FCC has already given the green light for the construction of powerful new Direct Broadcast Satellites operating in the 12.2 to 12.7 GHz frequency range.

Since it will take several years for the development of DBS satellites and their corresponding ground facilities, it is highly likely that one or more of the Ku-Band birds dedicated for use in the 11.7 to 12.2 GHz Fixed Satellite Service (FSS) will provide interim DBS services. Several of these FSS birds will be in operation over North America within the next year and a half. Although transmitting lower power levels than what the DBS satellites will be using, they could still deliver TV programming directly into the home via dishes of about four feet in diameter.

Anik C1-C3 Satellites

Canada's Anik C3, which was launched last fall onboard the space shuttle Columbia, is providing premium TV programming throughout Canada. Northstar Home Theater is buying Canadian video programs, scrambling them and reselling them to cable companies. Eventually, they will also offer their programs to individual households that are beyond the reach of cable systems. In addition to the premium program package, there are also three unscrambled educational channels available. Since the TV services on Anik C3 are using the half-transponder format, this reduces the available signal by several dBs, requiring dishes at least six feet in diameter for adequate reception.

At the time of writing, the Anik C2 was scheduled for a May, 1983 launch on the Space Shuttle Challenger. However, delays caused by leaks in the Challenger's propulsion system may push the date back to later in the year. Anik C2 will be leased by GTE and subleased to United Satellite Communications Incorporated (USCI) to provide the U.S. with an interim DBS service. Anik C2's footprint will be redirected from its originally-planned Canadian boresight to cover most of the Northern and Central U.S. USCI's new service will be primarily directed toward the 25 to 30 million American homes that are underserved or unserved by cable. For a subscription fee somewhere between $15 to $20 a month, USCI will provide its customers with two movie, one news, one sports, and one entertainment channel.

Although USCI plans to develop its own movie channels, it is quite likely that established cable services like CNN news, ESPN, USA Network, and others will be called upon to deliver the rest of the programming; this depends on what kind of agreements USCI can negotiate between now and its projected start-up date. USCI plans on scrambling to make its programming unavailable to non-subscribers.

The granting of permission by the FCC for USCI to use a Canadian satellite for an early DBS system has brought screams of protest from competitors who will not begin offering their own DBS services until 1985 at the earliest. Their main objections center on USCI's bypass of the regulatory process that was followed by those eight corporations whose DBS applications were approved by the FCC in 1982.

Unless the FCC bows to pressure from USCI's competitors, USCI's DBS service could be available as early as this fall via Anik C2. Plans call for it to move to the GSTAR1 satellite sometime in 1984. If USCI is successful, we can expect one or more of the DBS applicants now howling in protest to launch interim DBS services of their own in order to prevent USCI from seizing complete control of the entire U.S. DBS market. The following satellites could provide homes for some of these quasi-DBS services until the true-DBS birds are ready for operation around 1985 or 1986.

GSTAR Ku-Band Satellites

The GTE company plans a series of 16 transponder Ku-Band satellites using fourteen 20-watt and two 30-watt TWTA's. The fourteen 20-watt transponders can be switched between East or West Spot beams or CONUS coverage. The two 30-watt transponders are connected to a combined footprint which covers CONUS, Alaska, and Hawaii. When fully saturated, GSTAR's TWTA's will be able to deliver up to 48 dBW* via CONUS or up to 55 dBW* via East or West spot beams. GSTAR I & II will be positioned at 103 and 106 degrees west longitude. Transponders 1 through 8 will use vertical polarity, while transponders 9 through 16 will be polarized horizontally.

*dBW = decibels above 1 watt of power.

(Ku-Band transmissions have increased losses over the use of C-Band frequencies. That is why the EIRP contours delivered by Ku-Band birds are significantly higher than what is normally transmitted by C-Band sat-

ellites. Free space loss between the satellite and receiving earth stations on the ground are about 9 dB greater than what would be experienced at C-Band frequencies. Rain and high humidity will also attenuate Ku-Band signals whenever they are present. Finally, Ku-Band low noise amplifiers have a significantly higher noise temperature than their C-Band counterparts.)

Satcom K1-K3 Satellites

RCA Astro Electronics is developing a new series of Ku-Band Satcom satellites for deployment starting in 1985. These satellites are expected to supply communications services for customers in the SMATV, data nets, and teleconferencing businesses. Three axis stabilized birds will carry a payload of 16 full time transponders, each with a 54 MHz bandwidth. Each transponder will be able to utilize either full or half CONUS beams along with selectable vertical or horizontal polarization. The Satcom K birds will have 40 watt TWTAs providing EIRP contours of 39 to 47 dBW from full CONUS and 43 to 51 dBW from half CONUS beams. RCA plans on co-locating one of these Ku-Band birds with Satcom IV in order to simplify their stationkeeping requirements.

Westar IX Through XI

The first of three Ku-Band Western Union satellites is scheduled to be launched in mid-1985. Western Union is specifically designing these satellites to be accessed from small, relatively inexpensive earth stations. In many ways, the Westar Ku-Band birds will resemble the GSTAR satellites. They use the same frequency scheme with 16 cross polarized transponders each with a 54 MHz bandwidth, 1/4 and 1/2 CONUS coverage are possible through a switched network controllable from the ground, providing a maximum EIRP in the neighborhood of 46 dBW. Selection of polarization for each of the 16 transponders will also be controllable from the ground. This increased versatility will allow Western Union engineers to minimize interference between its services and those of adjacent satellites operating within the Ku-Band.

It is expected that Westar IX, Western Union's first Westar Ku-Band bird, will be placed at 91 degrees west. Originally, Western Union had planned on placing an Advanced Westar multiple-band satellite here; but now, WU is in the process of selling its interest in the program. Plans now call for the Advanced Westar birds to be completely used by NASA for the relay of TDRSS data transmissions from future space missions; no commercial video use of Advanced Westar is now envisioned.

SpaceNet Dual Band Birds

The SpaceNet dual band satellites will have six 72-MHz-wide Ku-Band transponders, each of which can accommodate two video signals at any one time. These transponders are equipped with 16 watt TWTAs and can provide coverage of between 45 dBW at boresight to around 39 dBW at beam edge. Several Ku-Band transponders will be used to relay SPCC's lighter route voice traffic. One or more of SpaceNet's Ku-Band transponders may also be used by CBS and others for experimental HDTV (High Definition Television) transmissions. The extra wide bandwidth would be necessary to accommodate the 1125 line video signals that HDTV would produce.

Ford Aerospace

Ford Aerospace has recently announced plans to construct a new series of dual band satellites, each with 54 available transponders. This is the wave of the future. We foresee that multiple band satellites with additional channel capacity will be the norm by the end of this decade. Increased demand for video, data, and audio services, along with severe limitations in available orbital positions in the Clarke Belt, will require advancements in traffic-handling capabilities not now available from current satellites in orbit.

True DBS services will not be available until 1985 at the earliest. Major decisions concerning future DBS satellites operating in the 12.2 to 12.7 GHz band will be made at the Regional Administrative Radio Conference (RARC) to be held later this year in Geneva, Switzerland. The decisions agreed upon by the countries of the Western Hemisphere at this pivotal meeting will be the subject of a future Satellite View column.

If you would like to learn more about satellite television, *The World of Satellite Television* by Mark Long and Jeffrey Keating is available from: The Book Publishing Co., 156 Drakes Lane, Summertown, Tennessee. Price: $8.95. Please include $1.00 to cover postage and handling.

Scanning The

Pennsylvania State Police

Frequencies (MHz) used by the various state enforcement agencies in Pennsylvania include:

45.30	State Liquor Control Board
154.905	State Drug Control
154.95	State Drug Control
155.445	State Drug Control
155.49	State Drug Control
155.505	State PD Channel C (bases)
155.58	State PD Channel A (bases)
155.67	State PD Channel B (bases)
155.79	State PD Channel A (mobiles)
155.85	State PD Channel C (mobiles)
155.91	State PD Channel B (mobiles)
159.21	State PD low power mobile range extenders

State PD Channel A is used for operation in counties: Westmoreland, Cambria, Indiana, Somerset, Potter, Cameron, Clinton, Tioga, Northumberland, Snyder, Lancaster, Chester, Northampton, Lehigh, Lackawanna, Wayne, Pike, Susquehanna.

State PD Channel B is used for operation in the following counties: Allegheny, Washington, Fayette, Greene, Clearfield, Jefferson, McKean, Clarion, Forest, Dauphin, Franklin, Perry, Adams, York, Cumberland, Montgomery, Philadelphia, Luzerne, Columbia, Monroe, Carbon, Sullivan, Bradford, Wyoming.

State PD Channel C is used for operation in the following counties: Butler, Beaver, Mercer, Armstrong, Lawrence, Blair, Bedford, Fulton, Clearfield, Mifflin, Centre, Berks, Lebanon, Schuylkill.

Pennsylvania State Police 10 Codes

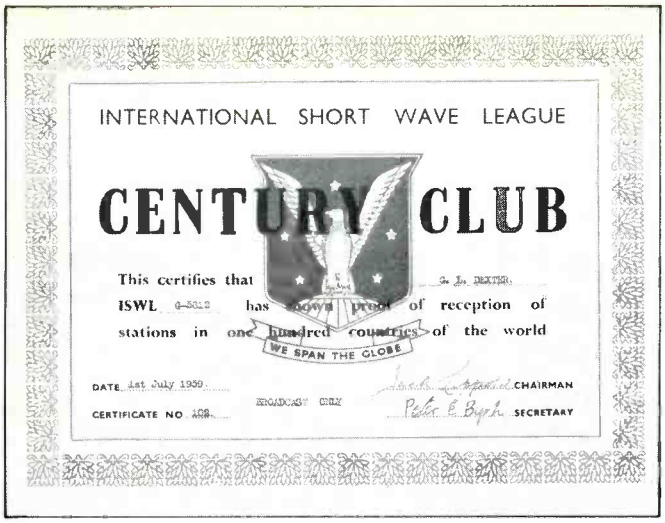
10-1	Signal weak
10-2	Signal strong
10-3	Stop transmitting
10-4	OK
10-5	Relay to _____
10-6	Busy
10-7	Out of service
10-7R	Out of service at residence
10-7	Permanent Dead
10-8	In service
10-9	Repeat message
10-10	No
10-11	_____ is on duty
10-12	Standby or stop
10-13	Existing conditions
10-14	Message information
10-15	Message delivered
10-16	Reply to message
10-17	En route to _____
10-18	Urgent
10-19	In contact
10-20	Location
10-21	Call _____ by landline
10-21I	Call _____ by landline (immediately)
10-22	Disregard
10-23	Arrived at scene
10-24	Assignment completed
10-25	Return to _____
10-26	Estimated time of arrival is _____
10-27	License or permit information
10-28	Ownership information
10-29	Records check
10-30	Danger, use caution
10-31	Pick up _____
10-32	_____ units needed
10-34	Time check
10-37	Intoxicated person
10-40	Advise if _____ available for call
10-42	Does not conform to regulations
10-43	Advise road/weather conditions
10-44	Stations involved acknowledge
10-45	Motor vehicle accident
10-46	Holding suspect, rush reply
10-47	Need ambulance
10-88	Package for _____
10-89	_____ is calling you
10-97	Request for radio check
10-99	Emergency at this station!
SIGNAL 33	Send help quick!

Pennsylvania Statute Codes

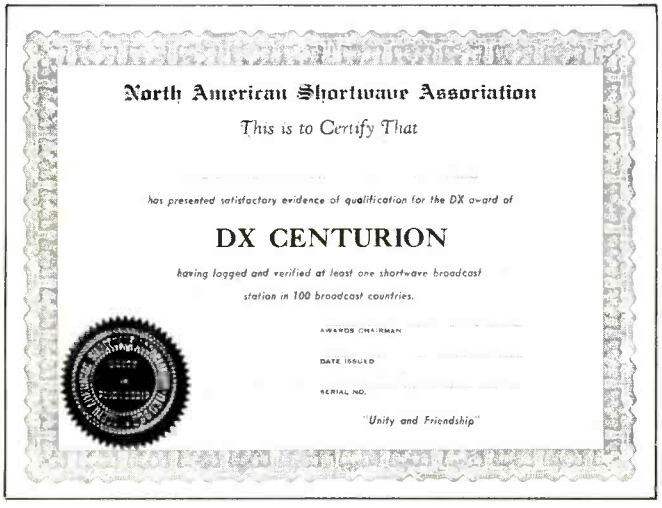
601	Driving without valid license
2501	Criminal homicide
2502	Murder
2701	Simple assault
2702	Aggravated assault
2705	Reckless endangerment
2706	Terroristic threats
2709	Harassment
2901	Kidnaping
3121	Rape
3125	Corrupting a minor
3127	Indecent exposure
3301	Arson
3304	Criminal mischief
3502	Burglary
3503	Criminal trespass
3701	Robbery
3714	Reckless driving
3731	Drunk driving
3732	Vehicular homicide
3926	Theft of services
4101	Forgery
4105	Bad checks
4905	Filing false police report
4912	Impersonating a police officer
5501	Riot
5503	Disorderly conduct
5504	Crank telephone calls
5505	Public drunkenness
5506	Loitering/prowling
5902	Prostitution
6308	Drinking by minor

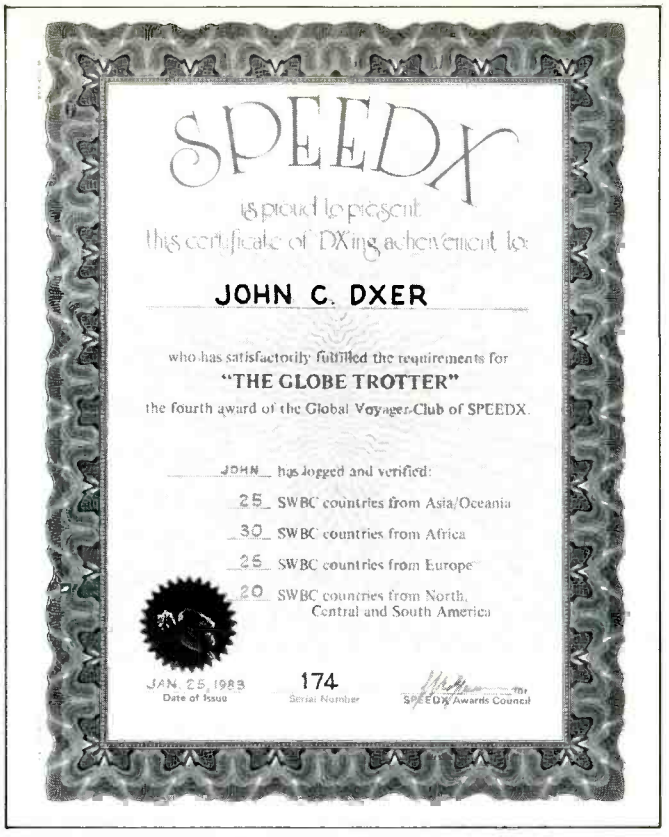
This information submitted to *POP'COMM* by Art Gross, KPA3NR, who adds that Pennsylvania State correctional institutions are on 45.16, while the Pennsylvania Turnpike operations take place on 156.195, 156.225, 159.045, 159.075, and 159.185.

Readers who can supply frequency and signal codes used by state enforcement agencies, as well as agencies in major cities and counties, are invited to send them in for possible publication in *POP'COMM*.



England's International Shortwave League issued this "Century Club" certificate to the author back in 1959!





The SPEEDX Club (P.O. Box E, Lake Elsinore, CA 92330) issues this "Globe Trotter" award to members who've confirmed 100 countries. Note that a certain number have to come from each continent. SPEEDX also has a series of awards which do not require verifications.

This is the "DX Centurian" award for verifying 100 countries issued by the North American Shortwave Association (45 Wildflower Road, Levittown, PA 19057). Endorsement stickers are available for post-100 reception. Once a DXer reaches 200 countries confirmed, he is eligible for the "Master DX Centurian."

Century Weekend

BY GERRY L. DEXTER

It's Sunday afternoon and a blanket of boredom has descended on your world. And there you are in your shack. It's one o'clock. What can you do to fill the hours? Nothing much on the radio. Clean the basement? Talk to the family? Go for a walk?

Your eyes fall on the shelf of QSL books and your hand is drawn to them. You pull one out and begin to flip through the pages. Ah yes, remember that one? Seems like just yesterday you logged that little Honduran, only it was years and years ago and they've now vanished from the airwaves forever.

The memories come flooding back. Ah, those were the days! Panama was still on the air. And Fiji and Jamaica and Brunei and Hong Kong.

The really big names in the hobby back in the early 50's—the fellows you really looked up to—had all of a hundred countries on their totals lists.

A hundred countries! Today's big names have 200! Times have certainly changed over the past three plus decades. Guess there are more countries on the air now, even though a few goodies have been lost along the way. And certainly a lot of them are using super power transmitters that didn't exist then.

And don't forget information. There's a lot more of that around now. DXers really get involved in the hobby today, generating new knowledge that wasn't even dreamed about back in the 1950's.

Back then it could take years to hear a hundred countries—even if you worked at it hard. Those who had a hundred had really paid their dues. Today, that first hundred could probably be logged in a matter of months, certainly less than a year.

Of course, there are all the advantages we mentioned that exist in 1983 that didn't exist in 1952. But still—could you do it in, say, two months? One month? Maybe even two weeks? How about one single weekend?

A weekend? A weekend to log one hundred countries? Now that would be a truly interesting experiment.

And thus the die was cast. The calendar was checked, a clear weekend found and duly circled in red. Schedules and recent loggings checked and collected from the many sources available, the 1983 *World Radio TV Handbook*, along with personal knowledge of what's where when went into a long, hour-by-hour check list.

Four periods of concentrated listening time were scheduled, beginning at 2300 GMT (5 p.m. local) on that Friday and running through late Sunday afternoon.

An effort was made to store up some extra sleep that prior week. Instructions were issued to the family grocery shopper to make sure we had a supply of coffee on hand.

Friday arrives. You're home from work just a little early so everything can be checked again and final preparations made.

So here it comes. 2258 GMT . . . 2259 . . . 2300 . . . the radio is on and here we go!

1. Sweden Radio Sweden in 11.705 good with end of their news in English and weather for Sweden, then into "Weekday—Friday" at 2303 GMT.

2. North Korea Radio Pyongyang on 11.930, in Spanish to Latin America with man and woman announcers, mentions of the Korean Communist Party at 2305.

3. Japan Radio Japan—NHK on 17.855 with news in English at 2308. Good signal.

4. USSR Radio Moscow on 15.140 with end of their English news at 2310 and into commentary.

5. Chile Radio Nacional de Chile, very good on 15.150 with popular American hits, mentions of "en Nacional de Chile."

6. Canada Radio Canada International on 5.960 at 2320 with news in English. Good and improving as the band opens up.

7. Uruguay Radio El Espectador at 2330 on 11.835, fair to good with identification, time check, and into news in Spanish.

8. Colombia Radio Nacional de Colombia on 11.793 at 2350, good with long talk in Spanish ending the first hour of tuning. Eight already. This is gonna be a snap. Could be all over by morning!

9. China Radio Beijing on 15.520 ending their "East Is Red" interval signal and into news in English read by a woman. Now it's Saturday, GMT.

10. Dominican Republic Radio Clarin, 11.700 with drama in Spanish. Strong signal.

11. Antarctica Radio Nacional Archangel Sao Gabriel at 0017 on 15.484.5 two men talking in Spanish, signal building.

12. Paraguay Radio Nacional de Paraguay on 9.735, signal is very good at 0059; ending "melodias de Paraguay" and then identification.

13. Vatican State Vatican Radio at 0100 on 6.015 with interval signal on guitar under identification "This is Vatican Radio, The Overseas Service."

14. Mexico Radio Mexico Intenational on 11.770 at 0104 with end of music segment. There was a man in Spanish with station identification.

15. Brazil Radio Nacional Amazonas on 11.780 at 0106, up tempo music, man announcer in Portuguese. Very strong.

16. West Germany Deutsche Welle on 6.040 at 0108, news in English. Very strong, so it may actually be the Caribbean relay rather than West Germany.

17. Ecuador HCJB on 9.715, very strong at 0110; religious program with phone in comments and questions.

18. Cuba Radio Havana Cuba on 9.770 at 0130. Usual march theme and identification in Spanish.

19. Switzerland Swiss Radio International at 0146 on 6.135. Man with English news, ID at 0150. Odd. Weak and QRM'd and other channels not audible.

Three hours gone by and 19 countries. Checking the target list shows a few Europeans missed as things progressed. Ah well, get 'em later. Time for a fresh cup of coffee.

20. South Africa Radio RSA on 11.730 at 0201, ending identification and into news in English. Should be stronger than it is.

21. Egypt Radio Cairo, noted in Arabic with poor signals on 9.475 at 0204.

22. Netherlands Antilles Radio Netherland Relay on 6.165 at 0206. In Spanish. Very strong as it should be.

23. Belize Radio Belize, 3.285 at 0208 with news by man. Strong but the band seems quite noisy.

24. Tadzhikstan SSR Radio Dushanbe on 4.635 at 0211 in Russian. Fair but lots of flutter.

25. Venezuela Radio Rumbos on 4.970 at 0212. Strong. Man in Spanish with baseball game.

26. Honduras La Voz Evangelica, HRVC, 4.820 good at 0215 with woman in Spanish.

27. Galapagos Islands La Voz de Galapagos on 4.810, rapid fire Spanish, National Anthem at 0220 and off 0225.

28. Guatemala Radio Tezulutlan, 4.835 at 0226 with music and man with Spanish ID. Into Marimba music. Brazilian underneath.

29. Costa Rica Radio Reloj de Costa Rica on 4.832 at 0228. Man in Spanish and mentions of Costa Rica.

30. Surinam Stichting Radio Omroep Suriname, 4.850 at 0230. Music, man in Dutch, time pips, mention of "SRS."

31. Albania Radio Tirana, 7.300 at 0238. Man and woman in unidentified language, music. Surprisingly weak. Usually quite good.

32. Argentina Radiodifusion Argentina el Exterior (RAE), 11.710 at 0240. Program of early jazz.

33. Bolivia Radio Movima, Santa Ana del Yacuma on 4.473; 0246 with local music and clear ID. Utility station interference but amazingly strong. Apparently this is not a normal weekend insofar as conditions are concerned!

34. Somalia Radio Mogadishu on 6.790 at their 0300 sign on. Very weak with flutter. Often heard far better than this.

35. New Zealand Radio New Zealand, 15.485 at 0310. Man with some sort of ongoing description or commentary. Poor.

36. Czechoslovakia Radio Prague; 7.345 at 0313, man in English, vocal music. Utility station QRM.

37. Peru Radio Arequipa, Arequipa on 5.949 "Radio Arequipa la emisora internacional" at 0329. Something's definitely up. Not one normally heard here in the local evenings.

38. Zambia Zambia Broadcasting Service, 4.910 at 0402, very weak with man in unidentified language and music.

First session ends with 38 countries under the belt and a bit of concern. Obviously conditions are disturbed, Europe is down. Time to relax awhile and then hit the sack. That alarm is going to go off mighty early!

39. Vanuatu Radio Vanuatu on 3.945 at 0948, very weak in talk segment. Parallel to 7.260.

40. Philippines Far East Broadcasting Company on 11.890 at 0958 with woman ending talk, man with identification "This is FEBC Radio International" gave frequencies and interval signal.

41. Haiti Radio 4VEH on 11.835 at 1017 with man in English and religious sermon. Co-channel QRM.

42. Australia Radio Australia on 5.995 at 1020 English news and commentary.

43. Vietnam Voice of Vietnam on 10.080 at 1023 with Vietnamese vocal music, woman in presume Vietnamese. Fair to good.

44. Mongolia Radio Ulan Bator, 12.070 at 1025 man in unidentified language, probably Russian. Weak.

45. Asiatic Russia Petropavlovsk-Kamchatka on 4.485 at 1130 choral music. Good level.

46. Nicaragua Radio Zinica, Bluefields on 6.120 at 1140. Brief music bits, man and woman in political talks in Spanish. Good but heterodyne.

47. Nepal Radio Nepal 9.589 at 1147 with opening interval signal, pause, interval signal, announcement. Fair.

Time to break for coffee. This is tiring work!

48. Thailand Radio Thailand, 11.905 at 1159 with interval signal, into language. Sudden, heavy QRM from 11.910. No time to check that one to find out who it is.

49. Kampuchea Voice of the People of Kampuchea, 11.938 at 1204. Very weak, flutter in vocal music.

50. Burma Burma Broadcasting Service, 4.725 at 1210. Very weak and fluttery with music.

51. Singapore Radio Singapore, 11.940 at 1246. Man in English but also weak and fluttery.

52. Papua/New Guinea NBC Port Morseby, 4.890 at 1250 with music. This year not the old reliable it has been. Very weak.

53. India All India Radio, 11.810 at 1340, ending English commentary by man, identification by woman.

54. Indonesia Voice of Indonesia, 11.790 at 1404. Weak, news. English?

55. Marianas Islands KYOI Saigon, 11.900 rock music, Japanese announcements. Fair at 1420.

56. United States WYFR, 15.215 at 1430 English religious program.

57. Madagascar Radio Netherlands Relay on 11.735, English news with African datelines followed by history of the automobile at 1448.

58. Iran Voice of the Islamic Republic of Iran, 15.084 at 1504. Weak, flutter. Talk and chants.

59. France Radio France International, 15.200 at 1520. Man and woman in French. Fair and fading.

60. Ascension BBC Relay on 15.260 at 1535 with football. Fair.

61. England BBC on 11.750 at 1540. Same program and also just fair as the second session ends.

Turn the receiver off and do a quick review. Many so-called "easy" ones missed

along the way. Europe's definitely in trouble. Better use some in between time to go back to the drawing board and come up with some new times and frequencies. Conditions are bad and it looks like trouble ahead.

Session Three began Saturday, 2245 GMT.

62. Libya Radio Jamahiriyah on 11.815 at 2250 with man talking in English. Poor level.

63. Malta Radio Mediterranean, 6.110 at 2258. Rock music, news in French. Only fair on this recent move from 5.960 which was better.

64. Grenada Radio Free Grenada, 15.045 at 2301. News in English and very good.

65. Israel Voice of Israel, 11.655 at 2304, man in presumed Yiddish. Only fair.

66. Turkey Voice of Turkey, 9.560 at 2317, Turkish music. Fairly good signal.

67. Iraq Radio Baghdad, 9.744 at 2320, Arabic talk and chants, good level but heterodyne QRM.

68. Portugal Radio Renascenca, 11.730 2328 with tone, chimes, interval signal, and identification in Portuguese.

69. Bulgaria Radio Sofia, 11.720 at 2330, interval signal and identification by man and woman in Spanish.

70. Belgium Belgian Radio 7.465 at 0031 Sunday, GMT. Weak, man talking over music. Europe continues to take a beating by poor conditions.

71. Spain Radio Espana Exterior, 9.630, 0038 with woman in English and news. Very poor. Usually excellent.

73. Poland Radio Polania, 6.135 fair at 0045 with classical music and announcer in Spanish.

73. Algeria Radio Television Algerienne, Algiers, 11.715 at 0052 with Arabic chants. Fair.

74. Italy RAI on 9.575 at 0100 with sign on—interval signal melody, woman with opening announcements, news in English. Very poor.

75. Tahiti FR3 11.825 at 0103, man in French, variety of music.

76. Yugoslavia Radio Yugoslavia, 11.735 man and woman in Spanish to Latin America. Fair at 0108.

77. Montserrat Deutsche Welle Relay Station, 9.545 at 0012 with English news.

78. Greece Voice of Greece on 12.045 at 0130, man and woman announcers. Very weak.

79. French Guyana FR3 Cayenne 3.385 at 0140, music and French announcements. Very weak with heavy noise on this entire frequency range.

80. Hungary Radio Budapest, 9.585 at 0203 with English news. Should be better than it is.

81. Qatar Qatar Broadcasting Service, 9.570 at 0245 sign on, Arabic. Very weak.

82. Antigua BBC Relay Station, 9.765 at 0250. Spanish to Latin America.

83. Ethiopia Voice of Revolutionary Ethiopia, 7.110 suddenly on at 0326 (listed for 0330 sign on), weak in unidentified language under CW QRM.

84. United Arab Emirates Radio and Color Television Dubai, 9.595 at 0338 with news in English by woman. Fair and parallel to 11.755.

85. Austria Austrian Radio, 5.945 at 0345. Music with man announcer. Poor with high side heterodyne from open carrier.

86. Congo Radio TV Congolaise, 4.765 0405 after the Brazilian signed off. French with African music but extremely weak.

87. Nigeria Federal Radio Corporation of Nigeria, Kaduna, 4.770 with English news at 0412. Fair.

88. Lebanon Voice of Hope, 6.215 at 0502, very weak with music. Utility QRM.

89. Gabon Africa Number One, 4.810 good with African music at 0505.

90. Cameroon Radio Bafoussam, 4.000 at 0515 with African music and man announcer in French. Good strength.

Well, we're now at just ten to go. Celebrate with a break. Still some Africans left and some Pacific outlets that can be added in this session so it looks like things may turn out well after all. Got scary there for a time.

91. Mauritania Radiodiffusion National de la Republique Islamique de Mauritaine, 4.845 at 0601. Fair with man in French and chanting.

92. Cook Islands Radio Cook Islands, 11.760 fair at 0605 with relay of Radio Australia's newscast.

93. Solomon Islands Solomon Islands Broadcasting Corporation, 9.545 with man giving news in English followed by island music. Good at 0608.

94. Togo Radiodiffusion National Togolaise, 5.047 at 0615 in French. Normally quite strong.

95. Benin Radiodiffusion du Benin, Contonou, 4.870 at 0615, in French and very weak.

96. Central African Republic Radio Centroafrique, 5.035 at 0618 with French announcer, African music. Only fair.

97. New Caledonia Radio Noumea, 7.170 at 0705, man in French and music. Fairly good.

Time to quit! One more session to go and three more countries needed so things are looking very positive.

Fourth session from 1500 GMT Sunday:

98. Finland Radio Finland International, 15.400 at 1510 and man and woman with news followed by music.

99. Roumania Radio Bucharest, 17.850 man giving frequencies in English, interval signal, at 1525. Good but co-channel QRM.

100. Saudi Arabia Broadcasting Service of the Kingdom of Saudi Arabia, 15.060 with chanting at 1530. Ahhh!

Now, for good measure and in case one or two of the earlier ones weren't what they were thought to be—

101. Monaco Trans World Radio, 11.655 at 1540 with long talk by man in Russian.

102. Afghanistan Radio Kabul, 15.077 at 1750, very weak, music. Seemed to be slowly improving in strength.

103. Kuwait Radio Kuwait, 11.675 at 1800 sign on in Arabic, weak and fluttery.

104. Iceland Icelandic State Broadcasting Service, 13.797 in single sideband with talk in Icelandic at 1903.

Off goes the receiver. *Out* we go from the shack. After 22½ hours of listening in less than 48 hours—the ears hurt, the mind spins, and fresh air is required.

As it turned out, disturbed band conditions caused the "loss" of a number of countries, including Oman, Malawi, Swaziland, Qatar, Upper Volta, Sierra Leone, Guam, Malaysia, Tibet, Manchuria, East Germany, South Korea, Denmark, Norway, and Pakistan, to name some of them. So, under normal circumstances, the total may well have been 120 or higher. Had the constitution been able to bear up, still more listening time might have bagged some of these, but the point was made and the game gratefully ended.

This, of course, was an experiment and very little time was spent listening to each of the stations logged. That is not a good example to follow, particularly if one intends to send a reception report in hopes of verifying the catch. The point was simply to see how many could be heard so the logs were made as fast as possible, based on station identification or advance knowledge or previous experience, which made it nearly certain that what was there was what it was supposed to be.

Normal listening and reporting activity would require much more data from each log for preparing a reception report and even claiming reception in the first place.

Verifying them is an entirely different story and definitely not something that can be done in a weekend! Still, one could venture a guess that with concentrated effort it might be possible to verify a hundred countries in a year or less.

Some DX clubs give awards for verifying 100 countries which look very handsome on the shack wall and are worth putting out an effort to achieve.

Whether it takes a weekend, a few months, or several years, the climb should be made at a pace you feel comfortable with. Once you've made it, you deserve a pat on the back.

But, after you've reached a hundred, remember this sobering fact—there's another hundred out there waiting for you!

No wonder they call it the SUPERFONE!

At Last—a Cordless Phone with TWICE the Range, Sound Fidelity to Rival Phones with Cords, and a Privacy Code System—All This in a Phone Less Than an Inch Thick!

The Super Fone is less than 1" thick. The base unit has a built-in speaker phone, a fully independent intercom and is 110 volt-220 volt switchable.

Until now, cordless phones have given you wonderful convenience. But they've had two problems:

1. The range is limited to 600 to 700 feet.
2. Some of them sound as though you're talking inside a barrel.

As cordless phones have become enormously popular, another problem has arisen: two people, living near each other, can have the same channel. Not only is there line confusion, but someone else can literally make a long distance call on your phone.

No more. Never again.

Range: 1500 Feet OR MORE!

The SuperFone 650 uses state-of-the-art electronics to bring you **the ultimate cordless phone.** Sound quality is superb — and it stays superb, 1500 feet or more from the base station. That's **more than twice the distance** of standard cordless phones.

Only SuperFone 650 has a secret code system to prevent interference and false operation of the phone. You choose from 512 possible "code" combinations. Both the base unit and the phone are **locked** onto that code, which you can change when you want to.

No other phone can interfere. No other unit can share the signal. No one else can hear or speak on your carrier-wave.

Enormous Range

We say the SuperFone 650 has a range of 1500 feet.

Notice we didn't say "up to" or "as far as" 1500 feet. There's no hedging, because this seems to be the **minimum**, not the maximum range.

Users report 1800 and 2000 feet. That's nearly half a mile. SuperFone 650 is a radiophone, not a toy, and that's why its signal doesn't break up or start hissing or crackling when you get half a block away.

You can tell when you heft it. It's a Little Giant. You can feel the power inside. What a marvel of electronic engineering it is! And it's tough, too. It fits into your shirt pocket, and you can bounce it around all day without damaging it.

Speakerphone, Intercom — Everything!

SuperFone 650 is The Everything Phone. Anything any phone can do, it can do.

First, the base station is a speaker phone. Touch a button and you can have a hands-free conference conversation in the room in which the base station sits.

Next, it's an intercom. You can page the handset from the base unit and have a private conversation. You have a **true wireless intercom,** not just a signal.

Third, you have a privacy button. Push that button and you'll still be able to hear anything the other party says, but he or she won't be able to hear you until you take the button off "hold."

Fourth, you have an automatic redial. Touch the key and the SuperFone will redial the last complete number.

What else? A **security switch** which makes it impossible for anyone to call out on the remote phone, without changing the ability to receive calls. A **volume control** for the speaker on the base unit. A **call button** to page the base from the cordless phone. THIS PHONE HAS EVERYTHING!

30-Second Installation

Plug your SuperFone 650 into any wall AC outlet. Push its standard modular terminal into the telephone plug. You're in business.

Every component is heavy-duty, from the built-in condenser microphone (with automatic gain control) to the LED indicator lights. This phone is designed for hard use.

The SuperFone 650 is yours for $249.95. If you want the SuperAntenna with it, giving you a range of a mile — or even more — you can have **both** for $319.95. (Or you can get the Super-Antenna alone for $79.95.)

We Absolutely Guarantee!

Use the SuperFone 650 (or any electronic instrument you acquire from us) for up to 30 days. If for any reason you decide not to keep it, return it for a 100% refund.

The SuperFone 650 — **$249.95**
The SuperAntenna — **$79.95**
BOTH Phone and Antenna — **$319.95**
Adapter for Multi-Line phone — **$39.95**

Add $4.50 per total order for shipping.

CIRCLE 6 ON READER SERVICE CARD

New!
MULTILINE ADAPTER FOR BUSINESS PHONES

If you have several lines, you can plug them into your SuperFone with this single adapter.

The adapter costs $39.95. Nothing else is required to attach multi-line phones to one SuperFone 650.

TRIPLE THE RANGE OF ANY CORDLESS PHONE!

The **SuperAntenna** will give your cordless phone, **regardless of make or model,** three times the range it has now.

If the range is 700 feet, it'll leap to over 2,000. If it's 1500 feet, it could be as far as one mile!

Easy to install. Only $79.95 complete. Add $4.50 for shipping.

For instant service, if you have a VISA or MasterCard, call toll-free 24 hours a day, seven days a week:

1-800-824-7888

Ask for Operator 551.
(in California: 1-800-852-7777)

The SuperFone 650, SuperAntenna, and Multi-Line Adapter are more electronic marvels from

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New York, NY 10119

RTTY

THE EXCITING WORLD OF RADIOTELETYPE MONITORING

BY JOSEPH JESSON

Many of our readers have written in to suggest a certain idea. The idea goes something like this: Set up the shortwave receiver to the desired RTTY signal and have a separate timer turn the receiver, terminal unit, and computer on simultaneously, collecting vast amounts of news data—even though one is busy doing other tasks—or sound asleep! This scenario has great appeal since one can wake up first thing in the morning and have a favorite news service completely downloaded into the computer's memory or disk storage. Even though this sounds straightforward, this approach is fraught with problems.

A major problem is receiver drift, since a very slight change in frequency can cause a large increase in received "hits" or errors. With today's quality terminal units and razor-sharp mark and space filters, a drift of only 50 Hz can create intolerable errors in the received Baudot signals.

The second major problem is one of computer-generated radio frequency interference. A computer used adjacent to a shortwave receiver can create harmonics which tend to mask the actual received signal.

Coupled with these two serious problems, we can add changing time schedules which often occur by the largest news agencies and the questionable propagation conditions that will arise.

Some of the drift can be reduced by leaving the receiver on continuously, since temperature stability will reduce any of the common thermal effects which create drift. Don't even consider a non-synthesized receiver for remote monitoring, since drift of greater than 150 Hz is common. One solution for the computer-generated RFI noise is simply not to use a computer, but to use a quality solenoid-based tape recorder. The tape recorder used should be high quality and reasonably low in wow and flutter noise because this will create distortion when it's played back into the terminal unit.

It is certainly no trivial task to receive FSK/RTTY signals automatically unless considerable time is devoted and suitable equipment obtained. Even the terminal unit or demodulator can create additional concerns. "Warm up" frequency drift can be noted over a half hour period in the order of 20 Hz to 30 Hz. The mark and space active filter has frequency dependent components that will shift values as temperature changes. Any detuning due to temperature effects or slight errors in center tuning will greatly affect the bit error rate (BER).

After experiencing the above problems when trying to automatically record the FSK signal, I found certain news point to point transmitters (i.e., PAP—26320.0 kHz) tend to abruptly shift the center frequency! While this shift is quite minor (usually about 15 Hz to 25 Hz), it is annoying since 100% copy on weak signals is dependent on accurate tuning. In this case, it is often useful to adjust the mark (normally 2125 Hz) filter slightly to maximize mark and space output. This adjustment is usually fixed and only by adjustment of the tape recorder's speed can this be corrected. However, few quality tape units have convenient tape speed controls.

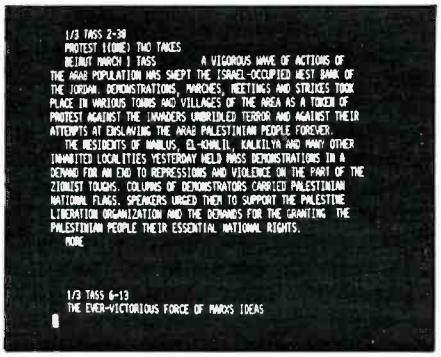


Figure 1: A strong anti-Israeli message is present daily in TASS transmissions.

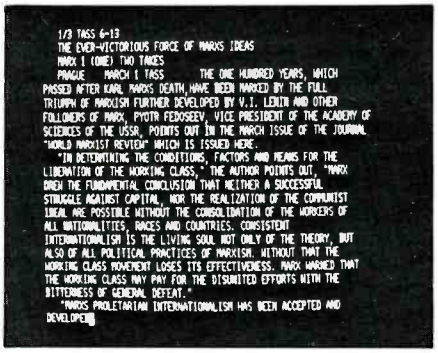


Figure 2: As part of the strong political statements made by the TASS news service, the ideas of Karl Marx are ever-present.

This month, we will focus on the TASS news agency and its idiosyncrasies and propaganda technique. Languages used include Arabic, French, English and Portuguese, with the majority of transmissions received in North America in English and French. The evening Arabic transmission usually begins around 1915 GMT on 12285.0 kHz and 10105.0 kHz. Arabic can be easily recognized by noting groups of characters ending in exclamation points and evenly grouped "words." TASS, as opposed to Reuters and The Associated Press, tends to concentrate on politics almost exclusively. Both Reuters and The Associated Press have a balance of world economic and scientific news with a smaller proportion of political news.

TASS began almost simultaneously with Stalin as the Secretary General of the Communist Party of the Soviet Union. Figures 1 through 6 reflect the daily news as reported by TASS—a typical mix of politics and the "Official Point of View." Some 70 news agencies subscribe to the TASS news service. Figure 1 shows a common theme on each daily transmission, strong anti-Israeli statements. The term Zionist toughs and terrorists is pervasive throughout the daily newscasts. A plug for Marx's ideas is illustrated by Figure 2. This standard propaganda pitch has the self serving title of "The Ever Victorious Force of Marx's Ideas" and calls for the uniting of the working class. Ironically, communism as practiced in the Soviet Union tends to ignore the working class, with special privileges and quirks given to the elite ruling party members. So much for communist theory according to Marx and "lived" by the Soviet Union.

Of course, the United States is viewed as imperialistic and a military threat—see Figure 3. The non-aligned conference is obviously supported by the official TASS viewpoint since many participating countries are Moscow's puppets. Indeed, the strongest signal of TASS received in the Midwest happens to be CLN451, 14901.0 kHz registered to Prensa Latina (PL), Havana, Cuba

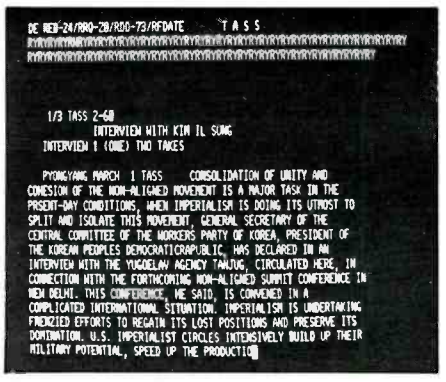


Figure 3: The United States is seen as imperialistic and the major military threat in the world.

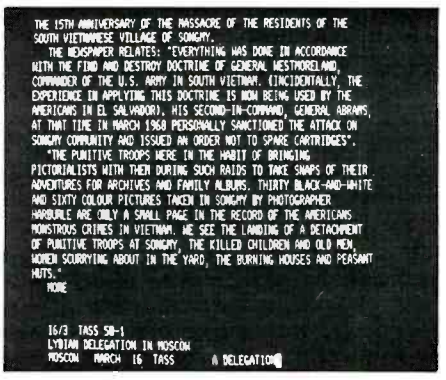


Figure 4: Propaganda makes its mark in the transmissions. Here, the "story" involves war crimes by the U.S. in South Vietnam against children and other innocent people.

Figure 5: An RY test slip that is followed by a French transmission.

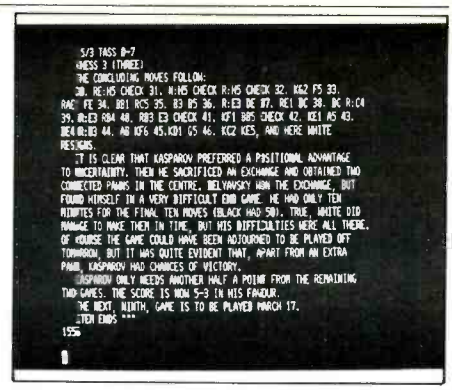


Figure 6: This message involves one of the Soviet's favorite games—chess.

at 1300 GMT and 1400 GMT. TASS news is received with an obscured S9 signal since an omnidirectional 5 KW transmitter is located at Bauta, Cuba. Specific PL news has been monitored at the same frequency from 1745 GMT to 2030 GMT. Since when is Cuba non-aligned?

Figure 4 demonstrates tools of the propaganda trade. Emotion ranks high as a tool to arouse hatred and mistrust. Terms such as "killed children and old men, women scurrying about in the yard" are classical emotional references used to influence behavior. Informative specifics are missing here; only propaganda and political messages. An RY test slip begins a French language transmission of RWW-70 on 19235.0 kHz. The RY test is a sequence of bit patterns in Baudot, representing alternate 1's and 0's. Note also a "VRXE" introduction. This cryptic message is simply displaying the character shift case table rather than the intended PAY/MONTH figures format. An 11011 Baudot figures code was missed due to signal dropout; hence, the following characters were "struck" in the letters mode. Interestingly enough, instead of football and soccer scores transmitted, the Soviets are in love with chess. Figure 6 outlines the latest chess moves and game schedules.

Ever wonder what the loud, raucous buzzing or humming sound is when tuning across shortwave? It's probably a frequency division multiplex transmission—very common from 4 to 25 MHz. Frequency division multiplex, or FDM, is simply a collection of narrow shift RTTY, one stacked upon the other separated only by a small guard band to prevent interference from each other. Instead of the commonly used shifts of 170 Hz, 425 Hz, and 850 Hz, FDM uses shifts of 60 Hz and 85 Hz. Filters designed to detect these very narrow shifts are quite tricky to design; and to my knowledge, only commercial FDM equipment is suitable for demodulation.

New FDM commercial demodulators are expensive, ranging from $1,900 to $4,000. Fortunately, a surplus supply has recently been found on the 1202 series of FDM demodulators: Electrovalue Industrial, Inc., P.O. Box 157JJ, Morris Plains, NJ 07950. Write for the pricing on these FDM units. A word of caution: Don't even consider receiving FDM unless you have a *very* stable receiver, along with *plenty* of patience!

Frequency	*Location*	*Time (GMT)*	*Language*	*Shift*	*Baudot Rate*	*Normal/Reverse Phase*
TASS—Telegrafnoie Agenstvo Sovietskavo Soyusa: The Official Soviet Press						
22791.0 kHz	Moscow, USSR	1300	English	425 Hz	50 baud	Reverse
22782.0 kHz	Moscow, USSR	1000	English	425 Hz	50 baud	Reverse
20965.0 kHz	Moscow, USSR	1420	Arabic	425 Hz	50 baud	Reverse
20585.0 kHz	Moscow, USSR	1330	French	425 Hz	50 baud	Reverse
19830.0 kHz	Moscow, USSR	1400	English	425 Hz	50 baud	Reverse
19235.0 kHz	Moscow, USSR	1315	English	425 Hz	50 baud	Reverse
19105.0 kHz	Moscow, USSR	1500	English	425 Hz	50 baud	Reverse
18870.0 kHz	Moscow, USSR	1600	French	425 Hz	50 baud	Reverse
18835.0 kHz	Moscow, USSR	1250	English	425 Hz	50 baud	Reverse
18540.0 kHz	Moscow, USSR	0600	English	425 Hz	50 baud	Reverse
18385.0 kHz	Moscow, USSR	0500	RY's	425 Hz	50 baud	Reverse
18160.0 kHz	Moscow, USSR	0600	French	425 Hz	50 baud	Reverse
17570.0 kHz	Moscow, USSR	0700	French	425 Hz	50 baud	Reverse
17510.0 kHz	Moscow, USSR	1300	English	425 Hz	50 baud	Reverse
17370.0 kHz	Moscow, USSR	0530	English	425 Hz	50 baud	Reverse
17360.0 kHz	Moscow, USSR	1300	Arabic	425 Hz	50 baud	Reverse
16260.0 kHz	Moscow, USSR	1230	French	425 Hz	50 baud	Reverse
16150.0 kHz	Moscow, USSR	1800	English	425 Hz	50 baud	Reverse
14880.0 kHz	Moscow, USSR	1300	English	425 Hz	50 baud	Reverse
14700.0 kHz	Moscow, USSR	1330	English	425 Hz	50 baud	Reverse

PRODUCT SPOTLIGHT

King Announces Refinements To KHF 950 HF SSB System

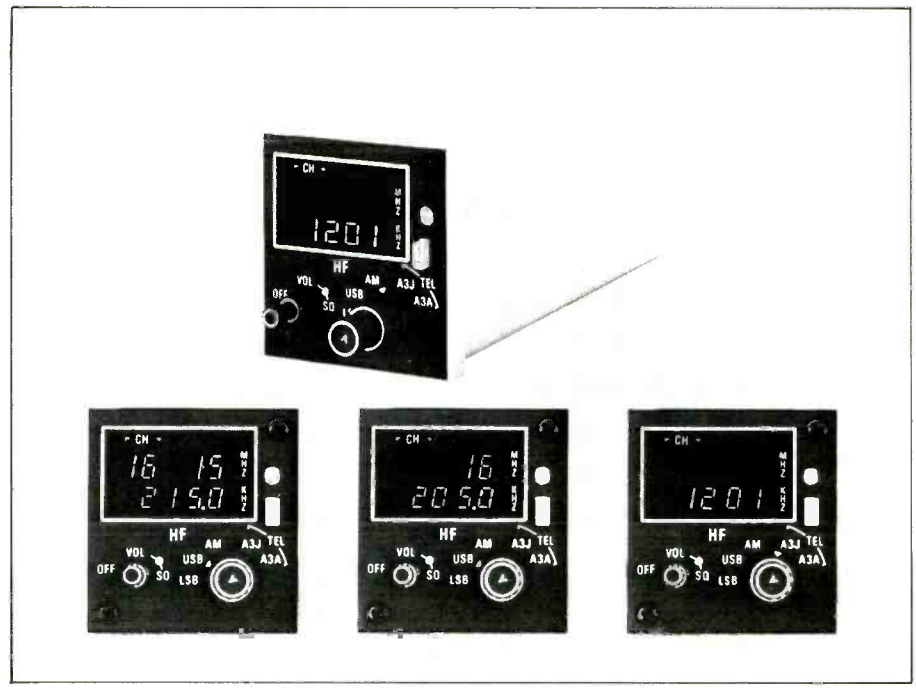
Thanks to five refinements on King Radio Corporation's KHF 950 HF SSB system, which is loaded with exclusive operator oriented features, long-range, high frequency communication has never been easier.

New capabilities for the KHF 950 HF SSB system, which King Radio Corporation introduced in February 1981, reflect the company's ongoing commitment to providing "even greater performance and utility" to high frequency communications. The new capabilities include:

- An optional KFS 594 frequency selector featuring all 176 ITU maritime radiotelephone channels pre-programmed, plus 19 additional operator present channels.
- An STC for single or dual installations in the Canadair Challenger CL600. Installation and engineering information was performed by K-C Aviation, Appleton, WI.
- A pending STC for single or dual installations in the Gulfstream GIII. Engineering is being performed at AiResearch Aviation's Long Beach facility.
- An optional KA 98 whip antenna for helicopters which allows full 2 MHz to 29.9999 MHz frequency range.
- New dual KHF 950 installation hardware featuring dual frequency receiving capability from just one antenna. An illustration, the pilot can monitor Air Traffic Control while his passengers in the cabin listen to the BBC or another station.

Officials said the optional KFS 594 frequency selector, which measures just slightly more than 2¼" square and matches the Gold Crown III control heads, optimizes communications flexibility with selection of upper sideband, lower sideband, AM, and radiotelephone mode. The new frequency selector comes with all 176 ITU radiotelephone channels preprogrammed for quick, easy access.

By having the 176 ITU radiotelephone channels permanently programmed, operators may easily call any radiotelephone station world-wide without actually having to manually select the separate transmit and receive frequencies. Therefore, in order to utilize an ITU channel, all the pilot needs to do is switch to the radiotelephone mode and select the desired ITU channel number.



The optional KFS 594 HF frequency selector is one of five refinements to King Radio's KHF 950 HF SSB system, introduced in February, 1981. Pictured on the bottom are (from left) the channelized, frequency "agile," and ITU radiotelephone channelization modes.

But the KFS 594's operator benefits are not limited just to the 176 semi-duplex ITU preset channels. In addition, the optional KFS 594 allows pilots to easily preset and store another 19 channels even while in flight. An exclusive non-volatile memory circuit retains all operator stored presets intact—even through aircraft shutdowns or inadvertent power interruptions—without requiring any battery power.

"In a nutshell," one King engineer said, "we've given aircraft operators 195 different communications channels at their instant beck and call with the KFS 594."

It may now be easier for a businessman from the United States to call his office using King's new HF with optional KFS 594 frequency selector while parked in an airport (say in Cairo) than he could using the Egyption or any other foreign country's telephone system.

The standard KHF 950 HF SSB system consists of only three compact units: the standard panel-mounted KCU 951 control/display; the remote KAC 952 power amplifier/antenna coupler; and the KTR 953 receiver/exciter. The entire system weighs just 20.2 pounds (9.16 kg)—less than a case of charts. If the KFS 594 control head is used, the KCU 951 is replaced with an additional small remote box in addition to the KFS 594.

In review, the operator can easily preset up to 99 frequencies with the standard KCU 951 frequency selector, including operational mode (USB, LSB or AM). Each preset can be programmed and channelized with separate transmit and receive frequencies when semi-duplex operation is needed. In addition, even with all 99 presets filled, the pilot can still direct tune a frequency without disturbing the presets (frequency "agile").

The standard KCU 951 control/display

King Radio Corporation's long-range, high frequency communications system, the KHF 950 HF SSB, is lightweight. It weighs just 20.2 pounds (9.16 kg) — less than a case of charts.

features large, easy-to-read, gas-discharge numerics that display frequency, active channel, emission mode, and transmit status. Furthermore, because the active preset frequency is displayed even during channel operation, a cumbersome "pull-out channel card" is not needed.

"There's just never any question about the operational status," one King official observed. "That makes life a lot easier for any pilot."

Company officials said the need to buy, store, and change crystals when new channels are required has been eliminated through the use of a frequency synthesizer. The refinements provide selection in 0.1 kHz steps spanning 280,000 different frequencies from 2 MHz to 29.9999 MHz.

The system's remote units can operate up to 55,000 feet without arcing problems in an unpressurized environment when using a grounded antenna. As a result, the remote units can be stored in the tail or another unpressurized area, rather than taking up precious cabin or baggage space. The KHF 950 HF SSB system also eliminates inconvenient manual antenna tuning. Instead, a King-designed microprocessor in the antenna coupler automatically tunes any grounded or ungrounded wire antenna larger than 10 feet in length. Hardware also is available for "shunt" and "notch" type antennas. It also operates off tune-fixed rod and towel-bar antennas used on helicopters.

According to company officials, the KHF 950 is King's first HF communications system and has been joined by the KMC 95 Marine and soon the KHF 970/KVR 980 Military, and KHF 990 Helicopter versions, thus offering total HF communications capability from King.

This material extracted from manufacturer's literature.

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).

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

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

WASHINGTON PULSE

FCC ACTIONS AFFECTING COMMUNICATIONS

New Experimental Authorizations

KE2XMG, Raytheon Service Company, Clifton, NY, experimental developmental station to operate on 1636.5-1645.0 MHz to provide technical maintenance training and operator training of applicants in Inmarsat system.

KM2XJG, Tundra Microwave, Inc., Fairbanks, AK, experimental developmental station to operate on 825-845 and 870-890 MHz bands to collect data and develop cellular system in State of Alaska.

KM2XJH, Tundra Microwave, Inc., Anchorage and Susitna Valley, AK, experimental developmental station to operate on 825-845 and 870-890 MHz bands to collect data and develop cellular system in State of Alaska.

KM2XJM, M/A Com Video Systems, Within Continental U.S., experimental developmental station to operate on 614-806 MHz band to demonstrate MLV 700 mobile TV relay link.

KM2XJN, M/A Com Video Systems, Inc., Continental U.S., experimental developmental station to operate on various frequency bands 1990-40000 MHz to conduct on-the-air tests and demonstrate equipment to prospective customers.

KM2XJO, Marcus Lee Perry, Tucson, AZ, experimental research station to operate on 10260.7 MHz to perform research as required by U.S. Government contract.

KM2XJP, Marcus Lee Perry, Kitt Peak Mountain, AZ, experimental research station to operate on 10250 MHz to perform various research as required by U.S. Government contract.

KM2XJQ, Eaton Corp., Deer Park, NY, experimental developmental station to operate on 9300-9500 MHz band for test bed in which field maintenance situations can be reproduced and analyzed.

KM2XJR, Goodyear Aerospace Corp., Akron, OH, experimental research station to operate on 9.5-9.7 GHz for transmission loss and deflection as required by U.S. Government contract.

KM2XJT, McDonnell Douglas Radio Services Corp., Lambert Field, St. Louis, MO, experimental research station to operate on 9200-9600 MHz band to develop and extend methods, mathematical procedures, and techniques for missile guidance.

KM2XJW, D.E.W. Line, Inc., Hiram, OH, experimental research station to operate on 47.66 MHz to research and develop an alerting system.

KM2XJX, Motorola, Inc., New York, NY, experimental developmental station to operate on 812.2375 and 857.2375 MHz to conduct a large area propagation study to determine building penetration and propagation characteristics according to building construction. Objective to develop reliable equipment.

KM2XJY, BBL Industries, Inc., Atlanta, GA, experimental developmental station to operate on 152.72, 152.78, 454.425, and 454.450 MHz, created for research and development of mobile telephone and paging terminals.

KM2XJZ, Control Applications, Inc., Houston, TX, experimental developmental station to operate on 154.45625 MHz to develop supervisory control and date acquisition systems via radio rather than wire line and modems.

KE2XMH, Energy, Inc., Washington DC, new experimental developmental station to operate on 1636.5-1645.0 MHz to develop instrumented security system for shipment of nuclear and uranium via commercial ships using INMARSAT communication system.

KE2XMI, Rich Electronics, Inc., Miami, FL, experimental developmental station on frequency 1636.5-1645.0 MHz to demonstrate capabilities of the INMARSAT satellite network to potential users.

KM2XKB, Repco Inc., Orlando, FL, experimental developmental station to operate on 928.3625, 928.3875, 952.3625, 952.3875, 953.550, and 957.150 MHz to test and demonstrate new equipment for use in Private Operational - Fixed Microwave Service.

KE2XMJ, State Of California, Mammoth Lakes, CA, experimental research station to operate on 401.7895 MHz to use GOES/DCS to obtain data used in fire weather forecasting and prediction of water runoff.

KM2XJK, Magnavox Government And Industrial Electronics Co., Continental U.S., experimental research station to operate on various discrete frequency bands to provide communication essential to a research project.

KM2XJV, Motorola, Inc., Maricopa County, AZ, experimental research station to operate on 226, 312, 375, and 9250 MHz to research equipment prior to shipment to Kingdom of Morocco.

KM2XKC, Southern California Edison Co., Monterey Peak, CA, experimental developmental station to operate on 952.6125 and 928.6125 MHz to provide propagation data, reliable information regarding unique operational problems, maintenance information, and to prove feasibility of new frequency bands for DDSMS type equipment.

KM2XKD, Detection Systems, Inc., Fairport, NY, experimental developmental station to operate on various discrete frequencies in 26, 27, 35, 42, 146, 151, 453, 462, 497, and 825 MHz band to test products for immunity to RFI.

KM2XKE, Sierra Research Corp., Western, NY, experimental developmental station to operate on 1122 MHz for development of beacon transponders.

KM2XKF, Wimpol, Inc., Gulf of Mexico, experimental developmental station to operate on discrete frequencies between 1609.30 and 1678.50 kHz and 173.2 MHz. Because of the construction of drilling rigs and equipment there are frequent unwelcome reflections which occur and therefore do not allow for precise positioning necessary in geophysical exploration. Intended use of station is to prove that accuracy of the Loran-C radio navigation system can be increased by telemetering correction data from monitoring station to vessels working in vicinity.

KM2XKH, National Semiconductor Corp., Santa Clara, CA, experimental research station to operate on 13.56, 27.12, and 40.68 MHz to research the development of a new liquid-phase process to be used in capping on of conductive aluminum pads. Under Government contract.

KM2XKI, Litton Systems, Inc., Van Nuys, CA, experimental research station to operate on 2900-3100 MHz band to support U.S. Government contract.

KM2XKJ, ITT Gilfillan, Inc., Newhall, CA, experimental research station to operate on various discrete frequencies between 5400 and 5900 MHz for antenna pattern testing prior to shipment to Sweden.

KM2XKK, Charles H. Hustig, Hudson, WI, experimental developmental station to operate on 902-928 MHz band to develop designs for equipment suitable for spread spectrum and narrowband weak signal communications.

KM2XKL, Lear Siegler, Inc., Santa Monica, CA, experimental research station to operate on discrete frequencies between 1750.0 and 1835.7 MHz for feasibility testing of possible radar system.

Policy For Fixed And Mobile Services' Use Of Spectrum

The FCC expanded its inquiry into spectrum allocations and technical standards for certain fixed and mobile services' bands to include the spectrum above 947 MHz.

On June 23, 1982, the Commission adopted a notice of inquiry to examine spectrum allocations and technical standards for certain fixed and mobile services' bands between 17.7 and 40 GHz in order to determine whether existing regulations were appropriate for the current and expected uses of the bands. The Commission pointed out that the existing standards for use of fixed service bands between 17.7 and 40 GHz had been largely determined in the early 1970's and that since then the bands have

remained largely undeveloped. The Commission solicited comments on a number of topics to develop guidelines for the future use of the bands which would encourage development in a rational and efficient manner. These topics included spectrum needs of foreseen applications by the fixed and mobile and other allocated radio services, appropriate technical standards, and licensing considerations.

On that day, the FCC adopted a report and order authorizing Direct Broadcasting Satellite (DBS) service in the 12.2-12.7 GHz band. In that order, the FCC instructed the staff to prepare a proposal to make spectrum available for private fixed service users who might be displaced from the 12 GHz band by the DBS services.

As a result, the Commission has now adopted a rulemaking notice expanding the scope of this docket to include consideration of bands between 947 MHz and 40 GHz and proposing specific rules and policies for fixed and mobile services' use of certain frequencies in that portion of the spectrum.

The emphasis of the proposals is to provide for reaccommodation of fixed service users who may be displaced from the 12 GHz band, specifically identifying the 2, 6, 13, and 18 GHz bands as available for receiving those displaced.

The Commission noted the proposals would lead to a considerable amount of sharing among various types of fixed service users, i.e., broadcast auxiliary, cable TV relay, and private operational fixed. It said that by opening up lower bands through interservice sharing, opportunities would be created to reaccommodate displaced 12 GHz users at less cost than would occur if they were restricted to move only to bands at 18 GHz and higher. Additionally, the Commission said, it would be beneficial in the long term to develop a use policy based on sharing that takes into account all fixed and mobile microwave users and that would embrace standards based on electromagnetic compatibility of particular uses in order to make efficient use of the spectrum.

Equipment Proposed For Authorization By Notification

The Commission has established a new procedure for equipment authorization, known as "notification," which is designed to shorten the delay in authorizing marketing of certain equipment and reduce the burden of the authorization process on both the FCC's and manufacturers' resources.

In concurrent action, the Commission proposed specific categories of equipment to be authorized under the notification procedure and under expanded use of its least stringent authorization procedure, known as "verification."

FCC equipment authorization procedures are the means by which the Commission determines whether new equipment is capable of being operated in compliance with appropriate regulations before it permits marketing of the equipment.

Notification Procedure

The Commission said the notification procedure would require significantly less than the current processing periods of 30 to 90 days or longer that existing authorization procedures entail.

Notification is similar to existing procedures but differs in that an applicant for authorization will not be routinely required to submit testing and other detailed information. Ordinarily, applicants will be required to submit only basic information, a statement that the equipment has been tested and found to be in compliance, and a statement of its intended use. More detailed information may be required on specific request, when indicated by circumstances.

Verification, very limited in application, requires only that an applicant determine compliance by testing. No information is submitted to the FCC unless it is specifically requested, no specific authorization is issued, and the FCC is not necessarily aware of equipment being marketed.

Authorization by those procedures will reduce the costly delays in placing equipment on the market and enable manufacturers to plan marketing and advertising lead-times more accurately, the Commission said. Time and effort expended on applications also will be reduced.

The FCC said it would choose categories of equipment carefully for authorization by notification and verification, generally taking into account their potential for interference with other services and their history of compliance.

Existing procedures will continue to be applied to equipment with a potential for interference problems, equipment used in new areas of technology, and equipment used in congested radio services.

Type approval, the most stringent procedure, requires FCC testing of the equipment before its marketing is authorized. Under type acceptance and certification, which apply to different types of equipment, the FCC reviews measurements and construction data submitted by a manufacturer, importer, or other applicant.

The Commission stressed that adoption of notification and wider use of the verification procedure do not mean downgrading of its responsibility to ensure equipment compliance with its rules. Applicable testing requirements remain unchanged and must be complied with, it said. Equipment must still comply with specified technical standards, it emphasized, and equipment subject to notification must be covered by a grant of authorization before marketing.

A strong sampling program will be undertaken, the FCC said, covering equipment authorized under all procedures. Greater use of sampling will ensure compliance of equipment coming from production lines and identify sources of interference-causing equipment.

Requests for additional information or samples before authorization under the notification procedure should be made sparingly, primarily for equipment with a history or probability of noncompliance.

The Commission proposed the rule change in action April 29, 1982. It's order, released May 7, did not review existing standards or propose specific equipment for authorization by notification or verification.

Proposed Categories of Equipment for Authorization

The Commission said it would be highly selective in its choice of equipment to be authorized by notification until it gained experience with the new procedure. In general, it said, to the extent the authorization procedure for licensed transmitters was relaxed it would require notification, rather than verification, because of their output power and the potential for interference resulting from their accompanying levels of unwanted emissions. It asked for comments on specific proposals for application of authorization procedures to equipment.

AM, FM, and TV broadcast transmitters and AM broadcast antenna phase monitors, which now require type acceptance, were proposed for authorization by notification. Since their operation is fixed, the FCC said, an interference source is readily detectable, and broadcast licensees would readily cooperate to resolve problems.

It also proposed notification for transmitters used in the fixed point-to-point microwave services. Noting the licensing and operational constraints under which they operate, it said any interference caused by systems operating in those services is confined to a small area and is relatively easy to detect. Those systems have no history of major interference problems, it noted. Wildlife tracking transmitters and ocean buoy tracking and telemetering transmitters also were proposed to be included under notification.

The FCC also proposed to include most receivers operating in the frequency range of 30 to 890 MHz. It excepted principally CB receivers, scanners, and super-regenerative receivers used primarily with garage-door openers and security alarm systems, for which it proposed to retain its certification requirement because of their interference potential. It asked for comment on how FM receivers with "seek and scan" capability and conventional-tuning receivers with ability to scan a priority channel might be differentiated from the scanning receivers which would remain under certification.

To avoid burdensome record-keeping requirements where equipment is used in more than one service, the FCC proposed that authorization of equipment under a more stringent procedure would constitute approval under notification where that procedure is required. It asked for comment on that proposal.

The Commission proposed to expand its use of verification initially only to television and FM broadcast receivers, which now require certification. Verification should be applied even more cautiously than notification, it said, because the requirements are less stringent.

While it would be preferable to make the greatest possible use of verification because

it is least burdensome and permits the greatest flexibility, the FCC said initially it would propose only equipment categories which seldom undergo major design changes, which have no history of causing harmful interference problems, and for which no major changes are expected in the type of service offered.

Compliance with emission standards has not been a problem with either TV or FM receivers. The FCC noted that manufacturer compliance with performance standards for television sets has been excellent and that it has proposed deletion of all performance reporting requirements except the annual UHF "noise figure" report. Retention of the current certification requirement is not needed to maintain performance standards.

The Commission proposed no change in authorization procedure for industrial, scientific, and medical equipment (covered by Part 18 of FCC rules); equipment used in the Amateur Radio Service (Part 97); equipment used under Parts 22, 81, 83, 87, 90, and 95 and remaining equipment used under Parts 15, 21, 73, and 74.

The FCC said four concerns governed its reservations: interference problems, congestion in the services involved, safety aspects of the service, and sharing of frequencies with government users. Mobility of the equipment was also a factor in some instances, it said. It noted that Part 18 equipment will be reviewed under a separate rulemaking in Docket No. 20718.

The following is a summary of proposed changes in the category of equipment authorization:

Rule Part	Present Category of Equipment	Proposed Authorization	Authorization
5	Wildlife tracking transmitters	Type acceptance	Notification
	Ocean buoy tracking and telemetry transmitters	Type acceptance	Notification
15	Receivers from 30 to 890 MHz excluding superregenerative receivers, TV and FM broadcast receivers and scanners	Certification	Notification
	TV and FM broadcast receivers	Certification	Verification
21	Fixed point-to-point microwave transmitters	Type acceptance	Notification
73	AM antenna phase monitors	Type approval	Notification
	Broadcast transmitters	Type acceptance	Notification
74	Fixed point-to-point microwave transmitters	Type acceptance	Notification
78	Fixed point-to-point microwave transmitters	Type acceptance	Notification
94	All microwave transmitters	Type acceptance	Notification

Inquiry Begun On Reexamination Of FCC Technical Rules; Specific Technical Regulations Proposed For Deletion

The Commission has begun an inquiry on its technical regulations with the ultimate intent of eliminating those which it finds no longer serve a useful purpose and replacing overly burdensome rules with less constraining ones.

Simultaneously, the FCC proposed elimination of certain technical regulations which it believes are no longer needed.

Technical rules are those of an engineering or technical nature which limit or otherwise govern use of the spectrum and the electrical characteristics of radio and other electronic equipment and systems under FCC jurisdiction. The Commission said elimination or modification of unnecessary and burdensome rules could stimulate technological innovation and allow for greater flexibility.

Most technical standards are established by FCC rules. The Communications Act provides detailed standards for the maritime service, and treaties and other international agreements to which the United States is a party contain technical standards and limitations applicable to facilities operated by FCC licensees. Such requirements will be considered by the Commission's staff as it develops specific proposals.

The Commission proposed to delete these rules: Transmission system requirements contained in Part 73 of FCC rules which govern the fidelity of AM, FM, and TV transmitters; and requirements on auditory assistance receivers used to assist the hearing-impaired, contained in Part 15 of the rules.

FCC rules traditionally have fixed standards for the equipment used in broadcast transmission. The Commission said competition among broadcasters probably is sufficient to control picture and sound quality. It asked for comments on the impact of the proposal and suggestions for deletion of other quality control regulations.

The regulations governing auditory assistance devices contain a number of technical standards on receivers. Some of those standards ensure that auditory assistance receivers can discriminate among many channels in a dense radio frequency environment. Because there is now a need for auditory assistance systems in less dense environments, the FCC proposed to delete receiver standards that seek to control quality of reception. It did not propose to change standards that guard against interference.

The Commission said its inquiry would consider whether some of its technical rules have outlived their usefulness and whether technological innovation in telecommunications has reached a pace at which rigid technical constraints could preclude other, more desirable services.

Competition in the telecommunications industry has lessened certain market structure concerns. There may be alternative regulatory approaches in some cases, which can provide essential control with fewer constraints on technological innovation. All those factors make comprehensive review of technical regulations and underlying regulatory policies timely.

The FCC said it would consider its technical regulations in regard to each of the regulatory purposes they are designed to serve: minimum quality or performance standards for equipment and services; equipment interoperability; interference control; and spectrum efficiency. It also said it would consider the different types or levels of technical regulations that it has already employed: performance requirements, design requirements, and licensee conduct requirements.

Most quality-related rules are found in the broadcast services, although common carrier rules also seek to guarantee quality. The rules mandate minimum performance standards to assure that a receiver, such as a television set, can receive and demodulate a transmitted signal.

Market incentives to control performance are growing in broadcasting, and in the common carrier services there are trends toward greater competition and diversity which may reduce regulatory concerns. Cable systems, too, are beginning to evolve into wider-purpose services. Innovative systems, such as cellular radio and digital termination, soon may be competing to provide local two-way voice and data services.

The increased competition and diversity which these new technologies promise have not yet been fully realized, the Commission said. The question that must be considered is whether competition and diversity are now sufficient to warrant elimination or revision of technical quality regulations.

Interoperability is the capacity of equipment to send or receive signals to and from equipment controlled by others. It is essential in broadcasting that a transmitter be able to communicate with receivers and that receivers be able to receive signals from a number of transmitters. Interoperability is an essential functional and safety factor in the maritime and aeronautical services.

Interoperability can be achieved in a number of ways. The present approach is to mandate common signal characteristics; converting equipment can achieve the same result. Low-cost converters, the FCC said, can provide a potential alternative to technial standards for achieving interoperability if and when they become available.

Regardless of the purpose of an interoperability standard when adopted, it may no longer be needed after it has been in effect for a period of time and all users are meeting it with relative ease.

If such rules were removed where a service is mature and safety is not a factor the standards involved probably would contin-

ue in use for a considerable time. Innovations probably would occur gradually, but an obstacle to change would be removed. The inquiry will consider whether some of the interoperability standards have outlived their usefulness and whether their deletion would have principally beneficial effects.

While interference control is a valid and essential government function, existing regulations are not necessarily the most efficient or least constraining means of achieving that control.

The most important rules appear to be those limiting transmitter or system output power and power roll-off. The rules often limit both transmitter output power and effective radiated power (ERP). Power roll-off rules require reduction in ERP on the outer frequencies of a channel and on adjacent channels.

While power-related limits appear to be essential, it may be possible to simplify them. Since ERP is a more direct means of controlling interference potential, transmitter output power limits may not be needed, and their elimination would permit greater flexibility in system design.

Still less constraining would be direct regulation of coverage areas and field strengths. Any combination of ERP and antenna directivity and location then might be permitted as long as the calculated field strength at the boundaries did not exceed the specified limit. The Commission recognized that both calculation and measurement of field strength can present complicated problems and that they may not be suitable for all services.

Where new, unoccupied channels are involved, more flexibility might be achieved by such means as subdivision of channels and grouping of contiguous channels, which were authorized in rules established for land mobile radio systems (PR Docket No. 79-191, released August 16, 1982) operating on private radio channels at 800 MHz.

Spectrum efficiency rules seek to control the amount of spectrum used to produce a given service output. The most obvious and direct method, extensively used, is to specify bandwidth; for example, UHF television has 6 MHz channels.

Where a single function and a maximum bandwidth are prescribed, the Commission said, additional technical regulations, such as modulation type and frequency tolerance standards, may not be necessary. Those rules might be eliminated, except in certain instances, such as where use of a channel is not limited to a particular communications function. Deregulation increases licensees' choices, the FCC said, and motivates them to use their channels more efficiently.

The Commission invited comments on the regulatory concepts discussed and on their applicability to specific services. Comment dates will be announced.

Demonstration Licenses In The Business Radio Service

The Private Radio Bureau, through its Licensing Division, has issued licenses to radio equipment manufacturers, communications sales organizations, and others for the purpose of demonstrating equipment, conducting propagation studies, and performing field strength surveys. These licenses were normally granted in the Business Radio Service to utilize itinerant-use frequencies. Licensees were also authorized to conduct these activities on frequencies assigned for their regular day-to-day business communications. In addition, these entities were usually able to obtain licenses in the Experimental Radio Service, governed by Part 5 of the rules, for these purposes.

Licensees advised us that the limitations imposed upon the itinerant-use frequencies were somewhat restrictive for this type of operation. Also, the procedures to be followed in the Experimental Radio Service were burdensome. Therefore, to alleviate these problems, the Licensing Division will now accept applications and grant licenses in the Business Radio Service to cover one or more bands of frequencies available to the Private Land Mobile Radio Services governed by Part 90 of the rules (25-50; 72-76; 150-174; 450-470; 470-512; 806-821/852-866; and 929-930 MHz).

The grants will be made subject to special conditions. Demonstrations or surveys pursuant to such licenses must be completed within a two week period. Any frequency allocated for use in a Part 90 radio service may be used provided that the technical limitations applicable to regular use of that frequency are observed. Also, there are areas where bands of frequencies cannot be assigned, e.g., in zones where prior coordination with Canada is required. The 470-512 MHz band will be authorized only in those areas where the frequencies are available on a regular basis in the rules. Further, portions of the 806-821/851-866 MHz bands are not available in the border areas of Canada and Mexico.

Licensees of this type of authorization should be aware of all of the technical limitations imposed upon bands of frequencies and all special limitations applicable to discrete frequencies contained in the various subparts of Part 90 of the rules.

The prospective licensees (those for whom the demonstration or survey is performed) must prepare and file a complete application, which includes establishing eligibility and compliance with the frequency coordination procedures, if required. A valid license must be obtained from the Commission prior to operating radio equipment on a regular basis.

Watch Requirement For Limited Coast Stations Eased

The Commission has provided a general exemption from the requirement to maintain a listening watch on 156.8 MHz for all limited coast stations serving coastal waters, and made VHF Channel 88A (157.425 MHz) available for intership communications on Lake Michigan beyond 75 miles of the United States/Canada border.

A limited coast station is a maritime radio station on land which serves the operational and business needs of ships. The frequency 156.8 MHz is designated as the distress, safety, and calling frequency in the VHF maritime mobile service, an international communication service.

The Commission previously exempted public coast stations from this watch in areas where coverage is provided by the Coast Guard or other government entity. This action provides similar treatment for limited coast stations.

The Commission said that exempting limited coast stations from the watch requirement will alleviate an unnecessary burden on the public, and the availability of an additional frequency in the Lake Michigan area will improve spectrum utilization.

800 MHz Frequencies In Detroit, Michigan And Cleveland, Ohio

The Canadian Government has advised the Federal Communications Commission that television broadcast station Channel 76 in Kitchener, Ontario and television broadcast station Channel 78 in Windsor, Ontario have ceased transmitting in the 842-848 MHz and 854-860 MHz bands.

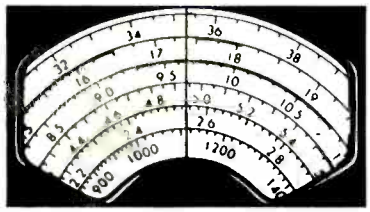
When the Commission adopted its Second Report and Order in Docket 79-191 (FCC 82-338, adopted July 22, 1982), releasing spectrum in these bands, it noted that under the terms of the agreement between the Canadian and United States governments, the United States had agreed to protect reception in Canada of these and three other stations from interference from private land mobile stations in the United States operating in the 806-890 MHz band. In this regard, the Commission stated:

"175. Prior to reassignment, each of the television broadcast stations is to be protected as follows: the field strength of an interfering mobile radio signal at the station's calculated B contour (where the protected contour crosses the border, that portion of the border lying within the contour shall be treated as the relevant segment of the B contour) is not to exceed 14 dBu for frequencies cochannel with the television channel utilized, and is not to exceed 54 dBu in the two adjacent 6 MHz guard bands. The field strength of any interfering signal is to be calculated using FCC Report R-6602 (50, 10) propagation curves at a receiving effective antenna height of 30 feet (9.1 meters).

"176. It is expected that the three Ontario television stations will be reassigned by the end of 1982. Until then, in the Detroit and Cleveland areas, 800 MHz land mobile systems will be authorized only if a technical submission is made showing that the agreed upon protection is provided the Canadian TV stations. Also, in order to provide protection from interference to the reception in Canada of certain other Canadian television stations, we will withhold authorization of the operation of land mobile base stations in the frequency bands and geographical areas listed in the attached Appendix."

On November 15, 1982, the Commission began accepting applications for frequencies in Detroit and Cleveland. As prescribed in our Second Report and Order, each such application was to be accompanied by the necessary technical submission. Furthermore, potential applicants were advised that if they were not prepared to make the necessary technical showing, they should not apply, since their application would not be granted. Notwithstanding these requirements, many applicants did submit applications in Detroit and Cleveland. None of these applicants, however, made the satisfactory technical showing.

In light of the re-assignment of these Canadian television stations, the submission of technical protection demonstrations is no longer necessary. We are, therefore, reopening the filing window for 806-866 MHz private land mobile frequencies in the Detroit and Cleveland areas only. The new submission period ran from March 15, 1983 to close of business April 15, 1983. After that date, they no longer accept applications in these areas until another Public Notice is released stating our intention to accept such submissions. We will retain on file all previously submitted applications even though at the time of submission satisfactory technical demonstrations were not provided.



COMMUNICATIONS CONFIDENTIAL

BY HARRY HELMS, KR2H

YOUR GUIDE TO SHORTWAVE "UTILITY" STATIONS

The photograph accompanying this month's column is of beacon station TOT, located near Denver, Colorado's Stapleton Airport. It was submitted by Patrick Griffith of Denver, who adds that TOT transmits on 281 kHz. The antenna is a "loaded vertical" which gives the station a low angle of radiation; that should help TOT to be heard at long distances. Give it a try! Our thanks to Patrick Griffith for the photo and info.

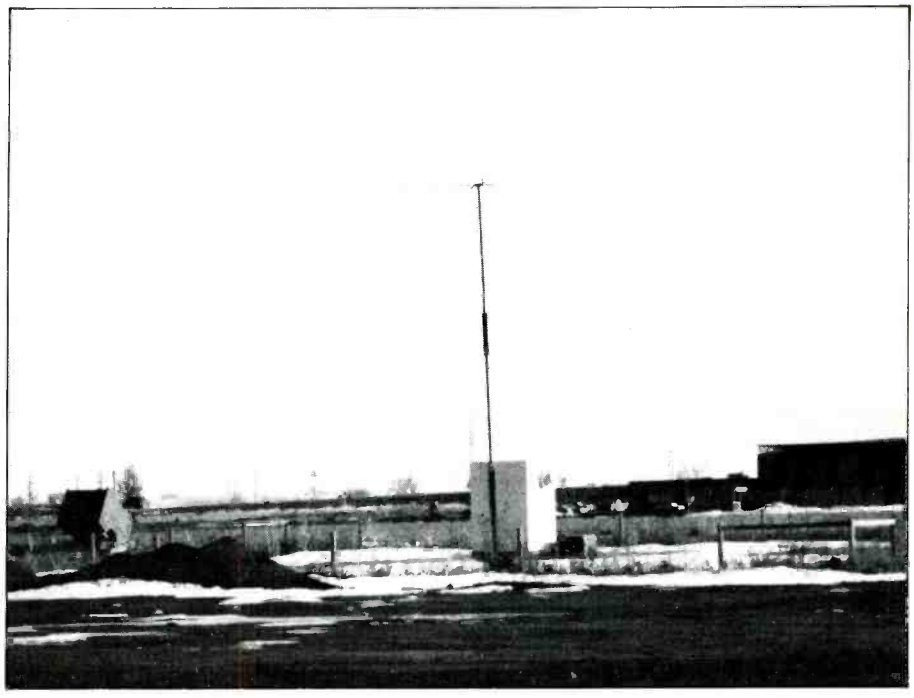
Michael Schulsinger of Springfield, Ohio writes with information about call signs and frequencies used by stations of the Federal Emergency Management Agency. FEMA is an independent agency reporting directly to the White House and participates in disaster relief. Each station serves different regions, as follows:

WGY901, Region 1, Maynard, MA
WGY902, Region 2, New York, NY
WGY903, Region 3, Olney, MD
WGY904, Region 4, Thomasville, GA
WGY905, Region 5, Chicago, IL
WGY906, Region 6, Denton, TX
WGY907, Region 7, Kansas City, MO
WGY908, Region 8, Denver, CO
WGY909, Region 9, Santa Rosa, CA
WGY910, Region 10, Bothell, WA

Michael also reports that he believes WGY900 is the call sign for FEMA headquarters in Washington, DC. He reports 10493 kHz is the most commonly used FEMA frequency, although 4604, 5211, 12216, and 20026 kHz are listed for FEMA along with 169.875 MHz. Many thanks, Michael!

This month, we received a letter from Robert Homuth of Arizona, reporting reception of a transmission from an offshore oil drilling platform (see the 16462 kHz item in Listening Reports). His report reminded us that other frequencies are allocated for use by offshore oil drilling rigs. Among these frequencies are 4419.4, 4572, 4643.6, and 4637.4 kHz, mainly for rigs in the Gulf of Mexico and off the coast of California. Other frequencies are 5374.7 (North Sea), 7971 (Libya), and 9040.6 (Australia). Most operations will be in SSB.

We also received confirmation this month that a new type of "numbers" station is now in operation. This one might be termed a "3/2" digit numbers station. Like the familiar five-digit numbers station, this type transmits coded groups consisting of five digits. However, there is a pause between the third and fourth digits which "splits" each five-digit block into two separate parts. Be on the lookout for these!



Beacon station TOT, located outside of Denver's Stapleton Airport. (Photo courtesy Patrick Griffith)

Featured Frequencies

This month, we're introducing a new feature in Communications Confidential. We'll be spotlighting certain stations and frequencies which are reportedly on the air but have not been reported in some time. The idea is to determine whether such stations are active and, if they are, their schedules and modes of operation.

For example, have you heard time signal station VEB2 on 4625 kHz? The latest *Confidential Frequency List* (published by Gilfer Shortwave, Box 239, Park Ridge, NJ 07656) lists it as operating from an unknown location, but possibly in Canada. Keep an ear on 4625 kHz and see if you can hear it!

Several frequencies are supposedly used by the Soviet Union for espionage transmissions in CW. Among these are 6430, 8888, 13120, and 14775 kHz. Can you hear anything unusual on these channels?

Many years ago, the frequencies just above the broadcast band were assigned for police and fire communications. Amazingly, some police and fire departments still are assigned frequencies there, although it is highly unlikely that any stations are still active. However, try 1618, 1626, 1630, 1634, 1642, 1650, 1658, 1666, 1674, and 1682 kHz during the night hours. Report anything you hear to Communications Confidential.

Listening Reports

Here are this month's listening reports. We'd like to see your reports here; please submit them in the form you see here and arrange items in ascending order of frequency. Send your reports to: Harry Helms, P.O. Box 157, Rockefeller Center Station, New York, NY 10185. Be sure to include a self-addressed stamped envelope if you desire a reply.

This month we also have several loggings contributed by members of the American Shortwave Listeners Club (ASWLC). For a sample copy of their bulletin, send $1.00 to ASWLC, 16182 Ballad Lane, Huntington Beach, CA 92649.

And now for this month's loggings . . .

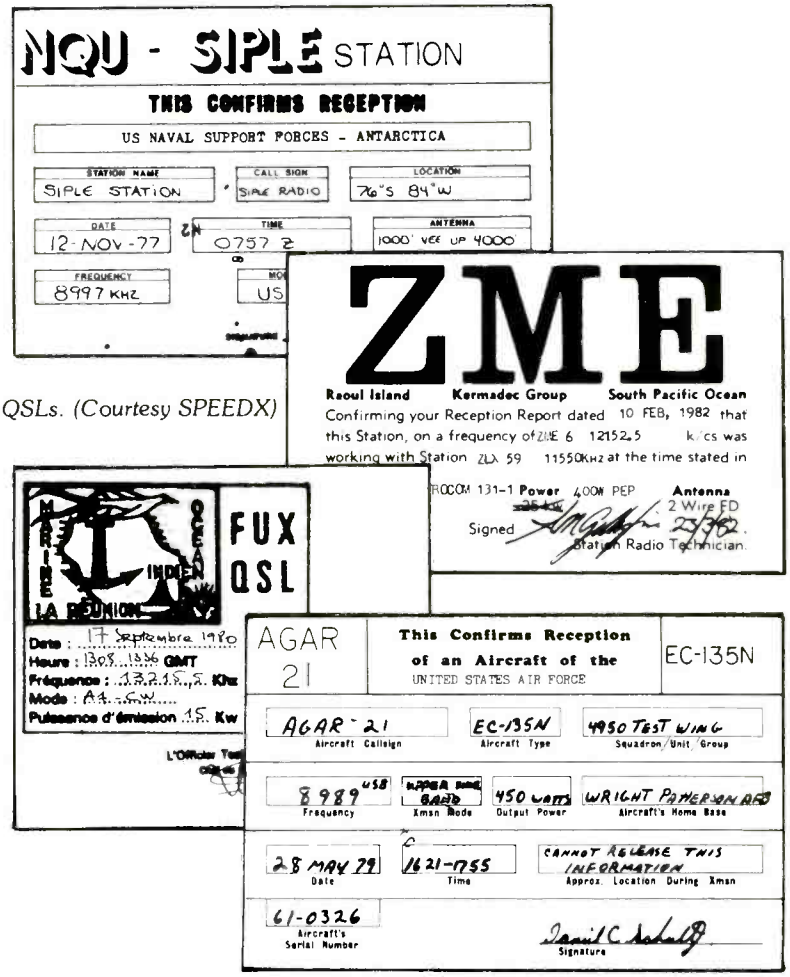
2670: NMF, U.S. Coast Guard, Boston, MA, weather bulletin in SSB 0515. (Tom Lewandowski, NY)

3090: Five-digit Spanish numbers station with female announcer 0404. (Lani Pettit, IA/ASWLC) This has been a common frequency for five-digit Spanish numbers stations for several years now. (Editor)

3435.2: GYA, Whitehall Radio, London, England, "DE GYA QSX" CW marker 0655. (Sam Neal, TX/ASWLC)

3442: Five-digit Spanish numbers station with female announcer 0800, bad modulation. (Lani Pettit, IA/ASWLC)

4237: VTP4, Indian Navy, Vishakhapatnam, India, "DE VTP" CW marker 1447. (Spencer Naylor, CA/ASWLC)
4308: Four-digit Spanish numbers station with female announcer 0328, heavy CW interference. (George Osier, NY)
4357.5: KMI, San Francisco, phone traffic in SSB 0317. (Stewart MacKenzie, CA)
4391.5: Unidentified Russian language station here in SSB 1038. (Spence Naylor, CA/ASWLC)
4431: NMN, U.S. Coast Guard, Portsmouth, VA, weather bulletin in SSB 0545. (William Bowman, IN)
4604: STE, unknown location, call repeated in CW 0814. (Spencer Naylor, CA/ASWLC) This call is part of the block allocated to Sudan, but I cannot find it listed in any of my references. Can you help, readers? (Editor)
4669: Four-digit Spanish numbers station with female announcer 0322, good signals. (Stewart MacKenzie, CA) Similar station with fair signals 0312. (George Osier, NY) These loggings and the respective signal strengths suggest this numbers station is located somewhere in or near the western U.S., rather than Cuba or Latin America. (Editor)
5000: ZUO, Pretoria, South Africa, AM time signals with Morse code identification 0429, weak signals. (Robert Homuth, AZ) An excellent, rare catch! (Editor)
5175: Five-digit Spanish numbers station with female announcer 0505, RTTY QRM. (Stewart MacKenzie, CA)
5320: "November Romeo" calling "Quebec Juliet" in SSB 0056. (Brent Levit, TX/ASWLC)
5320: Five-digit Spanish numbers station *with a male announcer* 0159. (Spence Naylor, CA/ASWLC) Very interesting! 5320 is a widely-used Coast Guard frequency, and numerous USCG stations must have heard this transmission. Also, note our previous 5320 item above. (Editor)
5349.9: "O" beacon, location unknown, 1151. (Spence Naylor, CA/ASWLC)
5350.3: "U" beacon, location unknown, 1151. (Spence Naylor, CA/ASWLC)
5519: VOLMET stations transmit weather information to planes aloft. They share common frequencies by transmitting in turn. All the following were heard in SSB: Auckland, NZ at 1220; KIS70, Anchorage, AK at 1225; KVM70, Honolulu, HI at 1230; KSF70, Oakland, CA at 1235; Tokyo, Japan at 1249; Hong Kong at 1245; and back to Auckland, NZ at 1250. (Robert Homuth, AZ) A terrific report, Robert! (Editor)
5810 to 5812: Four-digit Spanish numbers stations with female announcer around 0200. (Lani Pettit, IA and Spence Naylor, CA/ASWLC) If you'd like to hear a four-digit Spanish numbers station, try this frequency range during the evening hours. (Editor)
5920: Five-digit Spanish numbers station with female announcer 1030, clicking sound in background. (Robert Marsh, TX/ASWLC)
6344.5: UFM3, Nevelsk, USSR, "DE UFM3" CW marker 0703. (Spence Naylor, CA/ASWLC)
6506: NMC, U.S. Coast Guard, San Francisco, CA, traffic to ships 0513 in SSB. (Stewart MacKenzie, CA)
6729.5: "6ZSC 6ZSC 6ZSC DE 23XY 23XY 23XY V" in CW 1015. (Spence Naylor, CA/ASWLC)
6753: CHR, Canadian Military, Trenton, Ontario, weather broadcast in SSB 0520. (Stewart MacKenzie, CA)
6780: Five-digit Spanish numbers station with female announcer 0502. (Lani Pettit, IA/ASWLC)
6880: Five-digit Spanish numbers station with female announcer 0435. (Stewart MacKenzie, CA)
6956: Five-figure CW groups, each sent twice, ending with five "dahs" and slight 3-4 second buzz 0436. (no name on report) Please, everyone—be sure to put your name on each sheet of paper you submit for this column! (Editor)
6970: Unidentified Spanish language traffic net 0251. (Spence Naylor, CA/ASWLC)
7320: Five-digit English numbers station with female announcer 0308, voice quite distorted, transmission ended with "501" repeated three times and "36" repeated three times. (George Osier, NY)
7428.5: CW net of unidentified stations using such calls as AUL, BOF, KQC, with KCU as control. Messages consist of five-figure groups of letters and numbers, including the Spanish letter "nyeh" sent as "MW." Chatter between messages is in Spanish. Notd at 1410-1650 and 2100-2200. (no name on report)
7500: VNG, Lyndhurst, Victoria, Australia, AM time signals 1314. (Robert Homuth, AZ)
7511.7: "N" beacon repeated continuously 0310. (Spence Naylor, CA/ASWLC)
7532: Five-digit German numbers station with female announcer, opens with "Alpha Charlie" 0435. (George Zeller, OH/ASWLC)
8000: JJY, Tokyo, Japan, AM time signals 1259. (Robert Homuth, AZ)
8449: 8PO, Barbados Radio, Barbados, CW marker 0044. (Tim Wolfe, PA)
8459: LSA, Boca Radio, Boca, Argentina, CW marker 2350. (Tim Wolfe, PA)
8479: VIX, Canberra, Australia, CW marker 1350. (Tim Wolfe, PA)
8759: LPL, General Pacheco Radio, Argentina, male announcer in Spanish 0315. (Stewart MacKenzie, CA)
9072: Four-digit Spanish numbers station with female announcer 0200 and 0300. (Lani Pettit, IA/ASWLC)
9266: Five-digit German numbers station with female announcer 0104. (Lani Pettit, IA/ASWLC)
9972: Five-digit German numbers station with female announcer 0204. (Lani Pettit, IA/ASWLC)



Utility QSLs. (Courtesy SPEEDX)

10690: Unidentified Spanish language traffic 2256. (Robert Homuth, AZ)
11533: The "3/2" Spanish numbers stations first reported here last month have been heard again. At 1725, a female announcer was heard reading three numbers, then a pause, followed by two more numbers in each group. (George Osier, NY)
11965: YVTO, Caracas, Venezuela, AM time signals 0230 in parallel to 6100. (Stewart MacKenzie, CA)
12270: "O5R," location unknown, in CW 1814. (Spence Naylor, CA/ASWLC)
12315: Five-digit Spanish numbers station with female announcer 0100 and 0600. (Lani Pettit, IA/ASWLC)
12412: "Kilo Papa Alpha Two" repeated by woman in SSB 0017. (Lani Pettit, IA/ASWLC)
12745.5: VWC, Calcutta, India, CW time signals 0040. (John Cortis, CA/ASWLC)
12781.5: D3E51, Luanda, Angola, CQ marker 0230. (George Zeller, OH/ASWLC)
12950: "Kilo Papa Alpha Two" repeated in SSB by a woman 0017. (Lani Pettit, IA/ASWLC)
13079.5: SVT, Athens, Greece, V marker in CW 2304. (Spence Naylor, CA/ASWLC)
13668.8: Overseas Radiotelephone Station, Moscow, USSR, English voice marker read by woman in SSB 1645. (Spence Naylor, CA/ASWLC)
13386: Five-figure groups in CW, call of UPUI at 0020, possibly Soviet weather traffic. (no name on report)
13436: Five-letter groups in CW, no calls, at 1234 and 0110. (no name on report)
14894: "Proclaim" calling "Warner" in SSB 1701. (Spence Naylor, CA/ASWLC)
15035: VXA, Canadian Military, Edmonton, Alberta, weather broadcast in SSB 2223. (Stewart McKenzie, CA)
16463: Oil rig, operated by SEDCO of Dallas, TX, located near southeast coast of Australia in communication with Los Angeles 2340. (Robert Homuth, AZ)
16870: CWA, Cerrito, Uruguay, V marker in CW 2346. (Robert Homuth, AZ)
17246: KKN44, U.S. Embassy, Monrovia, Liberia, CQ marker in CW 2310. (Robert Homuth, AZ)
19359.8: OQX, Helsinki, Finland and FSB, Paris, France, both with CW traffic around 1625. These stations are part of the INTERPOL network. (Spence Naylor, CA/ASWLC)
19950: VPC, Port Stanley, Falkland Islands, traffic in SSB 1703. (Spence Naylor, CA/ASWLC)
20008: The recent Soviet Salyut-7 manned space mission used this frequency for telemetry. (Brian Webb, CA/ASWLC)
22120: Chinese language net, location unknown, AM 2118. (Stewart MacKenzie, CA)
22501: UFN, Novorossiisk, USSR, "DE UFN" marker in CW 1629. (Spence Naylor, CA/ASWLC)
23525: RCV, Moscow, USSR, CW traffic 1538. (Spence Naylor, CA/ASWLC)

Many thanks for your continued support! See you next month!

RADAR REFLECTIONS

RADAR DETECTORS AND THEIR USE

BY JANICE LEE

New Jersey State Police vs Radar Detectors

New Jersey State Police are installing gadgets to make motorists' radar detectors ineffective, according to Superintendent Clinton Pagano.

State police radar patrol cars are being outfitted with "beam interrupters" that will in effect put radar signals on hold until they are needed, instead of broadcasting the waves continuously, Pagano said recently.

Beam interrupters eliminate the three-second warm-up speed that a radar has.

Electrolert, Inc. refutes the claims that the recent acquisition of police radar "beam interrupters" are Fuzzbuster® proof. The sole purpose of such a gadget, which does not enhance the radar unit's performance, is to thwart motorists using radar detectors.

The whole story is not being told about such equipment, which is claimed to be "invisible" to radar detectors. Motorists as well as police officers are being misled by an incomplete presentation of the facts, says Dale Smith, inventor of the Fuzzbuster®.

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

Motorists need to be defensive drivers against this type of radar equipped with beam interrupters. Some points to keep in mind:

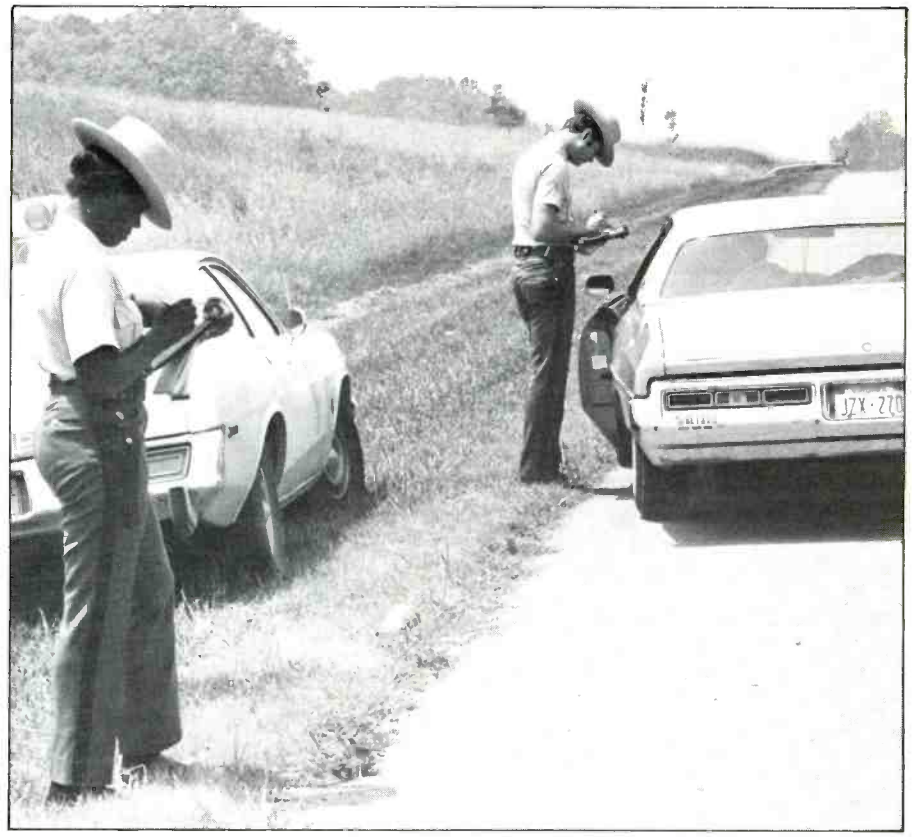
1. Avoid being "Number One Up" in any situation, such as cresting a hill, rounding a blind curve, or approaching any area where there is obvious cover for a radar set-up.

2. Always "drive" ½ mile ahead and behind. It is essential for you to identify trouble at least ½ mile ahead.

3. Watch for:

(a) A lead car approaching with congested traffic following.
(b) Brake lights in traffic well ahead of you.
(c) Other motorists traveling at *exactly* the speed limit.

New Jersey has long been a target for criticism by experts of police radar in that it has the heaviest concentration of police radar in the country. New Jersey's radar arsenal is in part comprised of at least 800 K-55 units (with an additional recent purchase of 250 more) which have been criticized by authorities for their fallibilities.



Electrolert, Inc. believes that the rational approach for New Jersey would be to spend the taxpayer's dollars on developing performance standards for the thousands of radar units on the highways and training requirements for the officers rather than on gadgets such as the beam interrupter which have been proven to be of dubious merit.

New Products To Thwart Police

Most officers will tell you that enforcing DWI and open-container laws is already tough enough — now it is tougher.

Police recently reported that plastic wrap-around labels, designed to look like soft drink labels, are turning up on more and more beer cans.

Marketed under the name "Hide-A-Brew," the labels falsely identify the contents of pop-top containers as "Pipsi," "Seven-Op," and "Mountain Dow."

This alteration of a single letter apparently protects the manufacturer from copyright infringement suits.

K-55 Radar Trial

A long awaited radar trial got under way in Defiance Municipal Court to test the accuracy of the K-55 radar device.

The test case, with Luther Oberhaus, 35, as the defendant, was necessitated by a Third District Court of Appeals finding that no testimony in its jurisdiction has been offered to substantiate the accuracy of the K-55 radar.

Since November 15, 1982, Judge Anthony DeJute has not taken judicial notice of the K-55 in his courtroom. What resulted were "not guilty" findings for any defendant cited who pleaded "no contest."

In this case, because the court needed the testimony to validate the radar's reliability, all costs to Oberhaus were paid, including his court appointed attorney, Eric Mertz. The City Law Department absorbed all prosecution costs.

Judge DeJute explained the trial was being held for the purpose of determining whether the K-55 radar is reliable enough to support speeding convictions in his court.

The prosecution was headed by City Law Director Harris Resnick and aided by his assistant, Jayne Yoder. Witnesses for the prosecution consisted of Ohio Highway Patrol Trooper James Kertesz and Edward Sergent of M.P.H. Industries, Inc. in Chanute, KS.

The witnesses for the defense included Jay Schreiber, President of Ultra Dynamics in Villa Grove, IL and Colonel Lee L. Nichols, Dean of Electrical Engineering at VMI in Lexington, VA.

Both defense experts went on to explain some of the inadequacies of the K-55 radar,

which included exceptionally large beam width, internal and external interference, panning and scanning errors, cosine angle errors, harmonic errors, etc.

Judge DeJute is expected to hand down a decision in the very near future.

Two More Anti-Detector Bills Introduced

Vermont House Bill #207 was introduced by Mrs. Nuovo of Middlebury. This bill makes mere possession of radar detectors illegal and states that any person violating this section shall be fined $200.00 and shall forfeit his/her property to the state.

Another state to introduce anti-detector legislation was Maine. S.P. 121, sponsored by Senator Carpenter, referred to the Committee on Transportation, prohibits the use, possession, or sale of any device capable of detecting radar upon highways.

Again, anyone who can assist in the defeat of this type of legislation will be greatly appreciated. For further information, please contact: The Legal Department, Electrolert, Inc., 4949 South 25-A, Tipp City, OH 45371, Attention: Janice Lee.

No, Lady, Police Radar Won't Turn Your Hair Green!

Trooper Bob Roten, Arkansas State Police, recently received a call from a lady who wanted to register a complaint. It seems she had passed a State Trooper with his radar unit on, and the "rays" zapped her, causing her otherwise blonde hair to turn fluorescent green.

Of course, he went on to explain a little bit on the subject of radar and that it could not cause her hair to turn green, purple, red, or any other color. He did, however, ask her to send a photo of her new-wave (no pun intended) hairstyle—preferably color!

Traffic Petition Circulates

A Temple man is trying to curtail Nolanville, Texas' "speed trap" through a referendum that would limit a city's traffic fine capability, but police Chief Bill Lee counters he is just enforcing the federally mandated 55 mph speed limit.

While there are other places in the state that operate speed traps, Nolanville is a "classic example," said Roy N. Lewellen, a businessman who is seeking to limit the amount of money a city may collect from traffic fines.

"I just think it's a disgrace to Central Texas because we have something like this going on," he said.

Lewellen said he wants to collect 5,000 to 6,000 signatures on the petitions, which will be sent to the governor's office and appropriate state officials to request that the Legislature limit the amount of revenue collected.

Nolanville's (population 1,308) city's budget estimated that $256,700 would be collected in traffic fines, court fines, and dog impoundments, which represented 59 percent of total projected revenues.

Citizens for Fair Law Enforcement, a group organized by Lewellen, has recommended that the amount of income from traffic fines should be "relative to the city budget and the tax base with excessive funds being awarded to the state to help maintain our highway system."

"Your assistance in protecting the public from unreasonable and unethical law enforcement within Texas is required," the petition said.

Lewellen said, "It's been going on for so many years that it is time for us little people to stand up and say, 'We've had enough.'"

Famous Speeders

John F. Kennedy, Jr., son of the late President John F. Kennedy, faced the loss of his driver's license after he failed to appear in answer to a speeding charge.

Kennedy was arrested by Connecticut State Police on the Connecticut Turnpike using radar and was charged at driving 81 mph in a 55 mph zone.

Assistant State's Attorney Robert Hall asked Judge Philip Mancini to order the suspension of Kennedy's driver's license after Kennedy failed to appear in court.

The judge approved the request for the State Department of Motor Vehicles to begin suspension proceedings under an interstate reciprocity agreement with New York.

Court officials said Kennedy had the option of paying a pre-set fine, but did not.

Zoom!

There goes Herschel Walker—with a steering wheel in his hand instead of a football. When officers in Greensboro, GA, recently tracked him on radar, they found out that the Heisman Trophy winner turned pro was traveling a snappy 72 miles per hour. Walker paid his $35 speeding ticket and proceeded to leave town.

When they learned of their famous visitor, five Greensboro residents offered to pay Walker's fine twice so he would be taken care of in advance if he cared to try an instant replay!

Man Sues For $1 Million In $45 Speeding Ticket Case

A Lawrenceville, GA man has filed a $1 million federal lawsuit against Gwinnett County Recorders Court officials and two county police officers in connection with a case involving a $45 speeding ticket.

Joseph C. Sun, an engineer acting as his own counsel, filed the suit last month in U.S. District Court in Atlanta. The suit names as defendants Recorders Court Judge John Lester, Recorders Court Solicitor Robert Mock, police officers J.M. Bush and Rick Diehl, and Gwinnett's county government.

Sun wants to be paid $1,052,000 for violation of his civil rights, loss of happy livelihood, and to punish the county for failure to perform its duty. The filing has been turned

over to Federal Judge Robert Hall. A jury trial has been requested, but the case might not be placed on a trial calendar for quite a while.

James Henderson, Gwinnett County attorney and counsel for the defendants, said his clients have replied to the suit but declined comment on the case.

The suit stems from a traffic citation written May 19, 1982, against Sun, who was charged with driving 55 mph in a 35 mph zone on Club Drive. Stopped by police using speed-detection radar, Sun was found guilty in Recorders Court and fined $45.

But he claims police did not advise him of his right to ask the radar be tested for accuracy. Sun alleges the radar was being used in a place with insufficient visibility to on-coming traffic, that the officers falsely testified against him, and that they conspired with Mock to injure and oppress him. Sun also claims Lester was prejudiced against him.

Further, the suit alleges Sun and his family believe they have to move away from Gwinnett because of "its unfair and discriminatory attitudes." Sun wants the court to order the defendants to reimburse him for the expense of establishing a new household.

Sun complains that on March 3, 1982, two months before the speeding incident, his car was struck and pushed off the road by a dump truck, causing $1,000 in damages. When he reported the incident, Sun says Gwinnett police failed to take a detailed report.

Instead, police arrested him for driving with a suspended license, a charge that later was cleared, the suit claims.

"Speed Trap" Charges Aimed Melissa, TX

"Melissa, Speed-Trap Capital of Texas" read 1,100 bumper stickers given away at a roadside convenience store in Plano, Texas.

These advertisements are just part of a campaign attacking the Melissa Police Department's habit of issuing speeding and other traffic-related tickets to drivers passing along the strips of U.S. 75 and State Highways 121 and 5 within their jurisdiction.

Charges of "speed trap" have been aimed at this small northern Collin County city for some time, but this organized resistance from area residents raises new questions about the operations of its police force.

Petitions bearing more than 150 signatures of county residents, many living outside the present Melissa city limits, have been sent to the State Highway Department and the Collin County Commissioners' Court in an attempt to stop annexation efforts.

A cover letter sent with the petitions emphasized that the signatures represented "a good sample of the public's attitude toward this proposed annexation: This attitude being a result of discontent with the Melissa City Council's abuse of their powers over the right of way."

City officials have denied that there is a speed trap being used by local police. Mayor Danny Spearman said "everyone knows there are 900 people a day breaking the law that come through Melissa; I can't help that."

"We don't have any speed trap," Police Chief Wayne Pickett said. In response to charges of harrassment, the police chief said, "We don't stop anyone without probable cause."

The city's audit in 1981 showed that over $200,000 was raised in traffic fines, and the 1982 audit showed revenues of more than $135,000 from this source.

The 600 resident city employs four full-time policemen, two reserves, two dispatchers, three patrol cars, two city clerks, a court judge, the city council, and mayor. All these people obtain their salaries from speeding and traffic revenues.

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

FREE RADIO FOCUS

ACTIVITIES OF UNDERGROUND BROADCASTERS

BY AL MUICK

Welcome to another edition of Free Radio Focus! The first bit of information this month comes from my cousin, Bob Kratzer in Allentown, Pennsylvania. Bob reports hearing KPRC in New York sporadically on Sundays on 1616 kHz between 0600 and 0800 GMT. Their programming is a mix of editorials, phone calls from listeners, and assorted music. On November 3, they discussed the New York elections, but had a slight problem with their phone line, which was telephone number (212) 799-9906. On December 31, the highlight of the night was someone calling to complain that KPRC was RFI'ing a neighbor's stereo . . . thank goodness the call was only a prank! Their address is: P.O. Box 747, Exeter, NH 03833.

WDX was heard by Frank Decker of Syracuse, New York on January 8th and 9th of this year, allegedly broadcasting from a ship 200 miles offshore (kinda hard to believe guys!). They played many tapes of other pirate stations and had a call-in number in New York City (I presume a loop line—Al). The telephone was answered by "Crystal Goblin" of WART, who told Frank that five New York City pirates had been busted in the last few weeks. Since that time, he has only heard PRN on the air and that was only for a five-minute test. Thanks a lot for the information Frank; we here at *POP'COMM* really appreciate it!

Next we have a long letter and a lot of information from Johnny Denham of Boaz, Alabama, who reports that KPHU is a new pirate on 7426 kHz. They play oldies and claim to be the only voice of Japanese Zen Buddhism in North America. The DJ is Maxwell Silver Hammer and he talked with listeners over the air. Free Radio North America has been very active on 7425 kHz with pop music and a loud signal but a very boring program. Radio Free Wave is being heard on 7425 kHz with pop music and a great signal, and a fair program. Radio Indiana is also heard occasionally on 7425 kHz with pop music and anti-Reagan commentaries. They have a fair signal, but must be the most boring pirate in North America (note: the comments are those of the reporter, not of the author—Al). Voice of the Pyramids was heard testing to Europe on 15035 kHz with a good signal. Radio Clandestine was heard on 7350 kHz with comedy skits, rock music, and a very professional sound. They have a very loud signal and have one of the best programs of any pirate. WOIS was heard on 7390 kHz with music by the Clash and a program called the "Dry Martini Show." Johnny also reports WTDT on 7425 kHz, which is a newcomer to our column. He played one Van Halen song and provided information on how to monitor Air Force One and spy numbers stations, and also talked to listeners on the air. They had a fair signal and used a Moorhead, Minnesota address.

Al Muick's shack.

The next letter comes from John Arthur of Box 4948, Arcata, CA 95521, who provides us with a current list of pirate addresses! Thanks a lot John, and sorry for the inaccuracies in the past! Box 220, Troy, NY 12181 is used only by WDX; Box 452, Moorhead, MN 56560 is used by Radio Free Radio, WART, KPHU, WTDT, The Crystal Ship, and the Voice of Venus; Box 747, Exeter, NH 03833 is used only by KPRC; Box 1851, New Britain, CT 06050 is used by Free Radio North America; Box 982, Battle Creek, MI 49016 is used by WOIS, WOOF, WHFO, WCRS, Radio Alpha Corona, Radio Confusion, Radio Indiana, Radio Xenon, Radio North Star, Voice of the Pyramids, Voice of SYNCOM, Voice of the Voyageur, and Radio Clandestine; Box 4948, Arcata, CA is used by WEAK, KCFR, KMUD, KQSB, KSSR, Radio Free San Francisco and Radio Telstar; Box 32052, Washington, DC 20007 is used by WPOT; and Box 40554, Washington, DC 20016 is used by PRN. John also adds that you should not enclose an SASE unless requested by the station, and if the station does not announce an address—*do not send off a report!!!*

I would like to relay a letter to all of you . . . you can take it for what it's worth. It comes from James C. Bryant of Braintree, Massachusetts. He says: "I've been on the air since February of 1980. I started on 108.5 MHz with an output power of 100 milliwatts. On May 21, 1982, I was raided by the FCC. The FCC moved in on me not because I was on the air, but for three various reasons. One was my fault, the other because other hobby broadcasters jammed me, and the third because of a friend.

"I'll start with me. I complained to the FCC about the other hobbyists jamming me. There were differences between us and by the time things straightened themselves out, it was too late. I told the FCC I was on the air. I told them how much power I was running and what frequency. I thought it was legal because I was only putting out 100 milliwatts. I did this in January of 1982.

"The FCC told me that they were monitoring me since March 1980 and that they had noticed the improvements I had made to my audio and that they liked my programming.

"On Friday, May 21, 1982 at 6:30 p.m., I left my friend to do a show, and he did a talk show using the telephone at my house. In this program, he and his friend started to use foul language and by the time I could get to the studio, it was too late. The words had gone out and guess who was listening!"

"It was also one-third the other hobbyists fault. They jammed me with 100 watts, not milliwatts of power. It got all over the south shore and it was cracked so high that the distortion spread across 1 MHz or so of bandwidth, miles from the transmitter.

"From my experience, I recommend that two or more hobbyists, in the same area especially, work out a schedule together if the same frequency is to be used. Another thing . . . do not use foul language. Isn't it a coincidence that the FCC visited me a few minutes after my friend used the foul language.

"If things are not worked out with another hobbyists in your area on the same frequency, anger and discrepancies could develop and jamming and complaints from listeners could result.

"Late night after midnight seems to be the safest time to operate. When I went to the FCC and told them about my situation, they wondered why they hadn't heard the jamming. It was around one or two a.m. that the jamming occurred, and that's when I was usually on the air. If such a hobbyist band is to be legalized, such things must be done in moderation. If we can get more people to take an interest in hobby broadcasting, perhaps the FCC will give up and legalize it."

Don't forget, if you have anything to contribute, the address is Al Muick, 3rd Opns Bn USAFSA, CMR Box 1912, APO New York 09458. Til next month, 73's, 88's, and FFFR! . . . de Al

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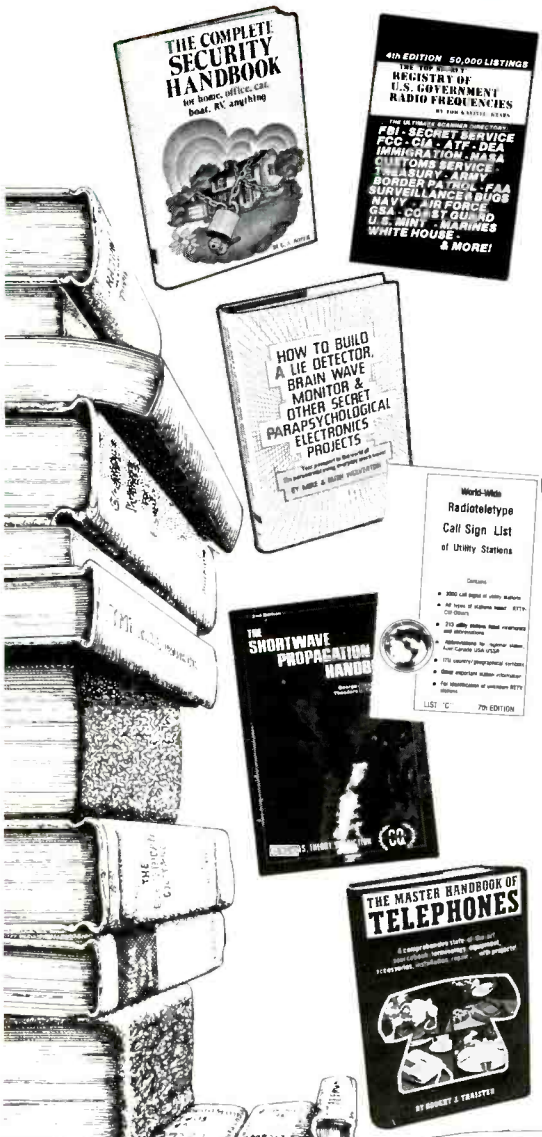

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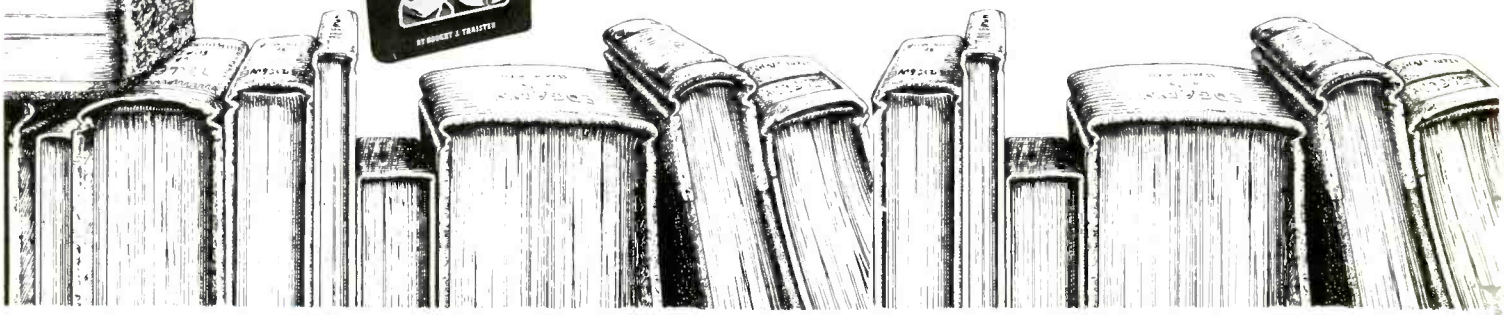

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