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
- 24 Hour English Language Shortwave Broadcasts
- POP'COMM Scans: America's Great Breweries
- An Inside Look At "The Voice of The Andes"
- Building Your Own Earth Station
IC-R70

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

**GENERAL COVERAGE RECEPTION AT ITS BEST**

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

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

**DESIGN**

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

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

**HAM'ING**

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

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

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

As an additional plus to ICOM IC-720A owners, the R70 has an optional interface that will allow the R70 to control the transmit frequency of the 720A for the ultimate in hamming versatility.

**SWL'ING**

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

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

**ICOM SYSTEM**

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

**PRICE**

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

CIRCLE 75 ON READER SERVICE CARD

ICOM America, Inc., 2112-116th Ave NE, Bellevue, WA 98004 (206)454-8155/3331 Towerwood Drive, Suite 307, Dallas, TX 75234 (214)620-2760.

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions.
INTRODUCING THE LATEST HEIR TO 59 YEARS OF GERMAN ENGINEERING.

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

The drafting tables of German engineers.

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

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

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

The bike's slender tail, artful as it 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, documentation, and handling charges. © 1982 BMW of North America, Inc. The BMW trademark and logo are registered trademarks of Bayerische Motorenwerke GmbH.
The Memory Keyer that started a revolution in CW

Store commands, as well as text, for automatic execution

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.

Other features include a built-in sidetone oscillator and speaker with volume/tone controls, phone jack and earphone, message editing, entry error alarm, self-diagnostics, battery back-up and a unique auto-shutoff should you forget. Complete details on the revolutionary µMatic Memory Keyer are in the new Heathkit Catalog and at your nearby Heathkit Electronic Center.*

Send for a free catalog! Write: Heath Company, Dept. 336-954 Benton Harbor, MI 49022
In Canada, contact Heath Company, 1480 Dundas Street E., Mississauga, ONT L4X 2R7.

Visit your Heathkit Store

Where Heathkit products are displayed, sold and serviced. See your telephone white pages for locations.

*Units of Veritech Technology Electronics Corporation in the U.S.
**FEATURES**

**“ECM” – Electronic Countermeasures**

Using communications to make’em think you’re somewhere (or someone) else!

*by Tom Kneitel, K2AES*

**Goliath Of The Andes**

Here’s HCJB, pioneer shortwave broadcaster.

*by Gerry L. Dexter*

**Secrets of Scramblers**

An expert takes a look at voice scrambling techniques and devices.

*by Lee Lapin*

**How The Russians Bugged Our Embassy**

Here’s the secret room bug the Soviets used to eavesdrop on our diplomats.

*by Tom Kneitel, K2AES*

**Equipment Review: MAG Electronic Polarizer**

Try this on your TVRO equipment.

*by Mark Long, WA4LXC*

**How To Build Your Own Satellite Earth Station**

It’s easier than you think!

*by Mark Long, WA4LXC*

**Selected English Language Shortwave Broadcasts**

A 24-hour round-up for your DX’ing convenience.

*by Gerry L. Dexter*

**POP’COMM Scans: America’s Great Breweries**

These could be a vanishing breed. Monitor them while you can!

*by Rick Maslau, KNV2GL*

**Build An Itty-Bitty Vertical DX Antenna**

No room at the top? Try this little DX monster on your receiver!

*by Randy Felton, KM5GR*

**A Non-Electronic Radio Transmitter**

It was a winner in 1922—a built from a doorbell buzzer and scrap parts.

*by Anson MacFarland, KVA4EX*

**Scanning The Pennsylvania State Police**

Checking out the busy troopers in the Keystone state.

*by Rick Maslau, KNV2GL*

**Century Weekend — Can You Do It?**

Here’s a good trick; rolling up 100 countries in jiffy time!

*by Gerry L. Dexter*

---

**DEPARTMENTS**

**Beaming In**

RTTY Monitoring

**Mailbag**

POP’COMM Product Spotlight

**POP’COMM Products**

Washington Pulse

**Survival**

Communications Confidential

**On The Line**

Radar Reflections

**Listening Post**

Free Radio Focus

**Scanner Scene**

Communications Shop

**Satellite View**

73

---

This month’s cover: Courtesy U.S. Army.
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..."
POINTED QUESTIONS
DESERVE SOLID ANSWERS!

Honestly, is your company enjoying as much growth and profit as it could? If it isn’t, do you know “WHY NOT?”.
Triangle Engineering may be your answer . . . but before you give us a call, take this quiz.

Does my current product line stack up?
Do my support services measure up?
Is my manufacturer solid from the ground up?

Triangle Engineering’s satellite antenna offers:
- Light-strong aircraft type construction*
- Parabolic surface TUNABLE at installation
- Standard mesh surface, with low wind load factor
- Unique two-man installation

Triangle Engineering supports your dealership with:
- Free sales materials
- Experienced sales and technical staffs
- Free installation demonstration with first order for qualified dealers

Triangle Engineering gives you the stability of:
- 30 years of experience serving consumers
- Proven industrial design and engineering expertise
- Annual sales revenues over $12 million

Triangle Engineering is the solid answer to all your questions. What’s the point of going anywhere else?

CALL US COLLECT TODAY AT 713-445-4251.

Triangle Engineering Company
P.O. Drawer 38271 • Houston, Texas 77238

*Patent applied for
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.

Alvan 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 statute, 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 position 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 publicly 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 involved 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.
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 Grand 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 POPCOMM 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, POPCOMM 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 been long 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 POPCOMM 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 exceedingly interesting), except that there 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 can in the Washington area can hear what's being broadcast in order to get their "cues." The call sign 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, 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 POPCOMM 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 I 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
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 confounding 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 echoes 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.

**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-signal, 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 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)**

---

**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.)**
get 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 PRN-4990) 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 water-proof, 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/CLQ-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.
The AN/ALQ-130 is a proposed jammer to be deployed in U.S. Navy attack and lighter 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 vulnerabili-

ty 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 homing, 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.
One of the world's most unusual radio stations is also one of 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...
HCJB INTERNATIONAL BROADCASTS

<table>
<thead>
<tr>
<th>UTC</th>
<th>Language</th>
<th>Target Area</th>
<th>Frequency kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000-0030</td>
<td>German</td>
<td>S. America</td>
<td>15175</td>
</tr>
<tr>
<td>0003-0119</td>
<td>English</td>
<td>N.S. America</td>
<td>15175</td>
</tr>
<tr>
<td>0030-0500</td>
<td>English</td>
<td>N. America</td>
<td>15150</td>
</tr>
<tr>
<td>0100-0199</td>
<td>English</td>
<td>N. America</td>
<td>9345</td>
</tr>
<tr>
<td>0230-0500</td>
<td>French</td>
<td>N. America</td>
<td>16795, 16810</td>
</tr>
<tr>
<td>0230-0250</td>
<td>Spanish</td>
<td>N. America</td>
<td>15175</td>
</tr>
<tr>
<td>0250-0500</td>
<td>Spanish</td>
<td>N. America</td>
<td>6060</td>
</tr>
<tr>
<td>0330-0500</td>
<td>Russian</td>
<td>European</td>
<td>11810, 9515</td>
</tr>
<tr>
<td>0330-0400</td>
<td>Russian</td>
<td>European</td>
<td>11832</td>
</tr>
<tr>
<td>0350-0500</td>
<td>Russian</td>
<td>European</td>
<td>11832</td>
</tr>
<tr>
<td>0430-0500</td>
<td>Russian</td>
<td>European</td>
<td>11810, 9515</td>
</tr>
<tr>
<td>0500-0600</td>
<td>Russian</td>
<td>European</td>
<td>11810, 9515</td>
</tr>
<tr>
<td>0600-0600</td>
<td>Russian</td>
<td>Nordic</td>
<td>11832</td>
</tr>
<tr>
<td>0600-0700</td>
<td>English</td>
<td>N. America</td>
<td>11915, 6005</td>
</tr>
<tr>
<td>0600-0600</td>
<td>Czech</td>
<td>Europe</td>
<td>11810, 9515</td>
</tr>
<tr>
<td>0600-0600</td>
<td>Czech</td>
<td>Europe</td>
<td>11810, 9515</td>
</tr>
<tr>
<td>0600-0600</td>
<td>French</td>
<td>Europe</td>
<td>11810, 9720</td>
</tr>
<tr>
<td>0600-0600</td>
<td>French</td>
<td>Europe</td>
<td>11810, 9720</td>
</tr>
<tr>
<td>0630-0700</td>
<td>German</td>
<td>Europe</td>
<td>11832</td>
</tr>
<tr>
<td>0700-0830</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>0700-0940</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>0700-1000</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>0700-1100</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>0700-1100</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>0700-1200</td>
<td>Swedish</td>
<td>Sweden</td>
<td>11910</td>
</tr>
<tr>
<td>0700-1315</td>
<td>Spanish</td>
<td>S. America</td>
<td>15, 1295</td>
</tr>
<tr>
<td>0700-1330</td>
<td>Spanish</td>
<td>S. America</td>
<td>9720, 6070</td>
</tr>
<tr>
<td>0715-1130</td>
<td>Spanish</td>
<td>S. America</td>
<td>11875, 6130</td>
</tr>
<tr>
<td>1030-1120</td>
<td>Japanese</td>
<td>Japan</td>
<td>9115, 6078</td>
</tr>
<tr>
<td>1030-1120</td>
<td>Swahili</td>
<td>N. America</td>
<td>11910</td>
</tr>
<tr>
<td>1030-1250</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1100-1230</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Spanish</td>
<td>S. America</td>
<td>9720, 6070</td>
</tr>
<tr>
<td>1230-1315</td>
<td>Spanish</td>
<td>S. America</td>
<td>11910</td>
</tr>
<tr>
<td>1300-1315</td>
<td>Spanish</td>
<td>S. America</td>
<td>11875, 6130</td>
</tr>
<tr>
<td>1330-1420</td>
<td>Japanese</td>
<td>Japan</td>
<td>9115, 6078</td>
</tr>
<tr>
<td>1330-1420</td>
<td>Swahili</td>
<td>N. America</td>
<td>11910</td>
</tr>
<tr>
<td>1345-1415</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1430-1520</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1500-1600</td>
<td>French</td>
<td>Europe</td>
<td>15295</td>
</tr>
<tr>
<td>1500-1700</td>
<td>French</td>
<td>Europe</td>
<td>15295</td>
</tr>
<tr>
<td>1600-1700</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1700-1800</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1800-1900</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>1900-2000</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>2000-2100</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>2100-2200</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>2200-2300</td>
<td>German</td>
<td>Europe</td>
<td>11832, 9720</td>
</tr>
<tr>
<td>2300-0000</td>
<td>Quichua</td>
<td>S. America</td>
<td>12300, 9745</td>
</tr>
<tr>
<td>2300-0230</td>
<td>Spanish</td>
<td>Europe</td>
<td>21480, 19295</td>
</tr>
<tr>
<td>2300-0230</td>
<td>Russian</td>
<td>Europe</td>
<td>21480, 19295</td>
</tr>
<tr>
<td>2300-0230</td>
<td>Russian</td>
<td>Russian</td>
<td>15175</td>
</tr>
<tr>
<td>2300-0230</td>
<td>Portuguese</td>
<td>Portugal</td>
<td>15993</td>
</tr>
<tr>
<td>2300-0310</td>
<td>Portuguese</td>
<td>Portugal</td>
<td>17745, 15295</td>
</tr>
<tr>
<td>2300-0330</td>
<td>German</td>
<td>Europe</td>
<td>19175</td>
</tr>
</tbody>
</table>

HCJB’s round the clock schedule.

HCJB, Box 691
Quito, Ecuador

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.

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: programming, non-interference in Ecuadorian politics; concern and involvement in local activities; and helping the Ecuadorian people whenever, wherever, and however possible.

“Racio 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 Hospital, 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
Hicksville, NY

Planning to...

around...and added...

HCJB’s Music Department maintains a library of 6,000 long playing records and thousands of audio tapes. Each language department has its 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 snears 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 Kuushikov presents a program in Russian.

In addition, The World Radio Missionary Fellowship operates broadcast band stations KVMV, McAllen; KBNR, Brownsville; and KOR, 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 in 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 DXers 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 listening, 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.

www.americanradiohistory.com
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.
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.

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.

3. Bandsplitter-Inverter. In this method, the audio band is divided into 4 or 5 sub-bands 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-
allows 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 intercept 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 demodulation 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 scrambler 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 71901.

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

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...

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 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 jambugging 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 out of the room in which the window is located. The system bounces the laser beam sufficiently to cause the laser beam’s reflected beam to become modulated so that the conversation can be retrieved.

The most 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!
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 accommodate 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 pickup 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.

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 rotation-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
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 milliamp 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.
Buying Your First Satellite Earth Station

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
KENWOOD R-2000

LENET $599.95
EEB $529.00

Optional—call for a quote. Optional RIT to be announced. EEB now provides an extended 90-day warranty.

YAESU FRG-7700*

Options:
- FRA-7700 Active Antenna $59
- MU-7700 12 Channel Memory $135
- FRT-7700 Antenna Tuner $59
- FF5-VLF Low Pass Filter $20
- DC-7700 12 VDC Kit $8
- FRV-7700 VHF Converter $135

Our Best Seller!
- 150 KHz-30MHz
- All mode AM-CW-SSB-FM
- Digital Frequency and clock

LIST $549
SALE $439

*EEB now provides an extended 90-day warranty, effectively doubling your warranty; 6 months parts and labor at no cost to you.

KENWOOD R-1000 & R-600

COMMUNICATIONS RECEIVERS

AM, SSB, and CW modes. Built-in noise blanker. PLL synthesizer covers 30 bands between 200 KHz to 30 MHz. Ideal 3-stage IF filters for receiver mode. Power requirements 100, 120, 220, 240 VAC. 50/60 Hz-12 VDC option.

R-600 Sale $329
R-1000 Sale $429

WORLD RADIO TV HANDBOOK 1983

Now in the 37th edition! The Shortwave listeners' Bible. A MUST! Over 70 pages listing the long and medium wave stations throughout the world. Over 30 pages devoted to a listing of all the shortwave stations throughout the world. Over 45 pages listing worldwide television stations with addresses and names of key personnel. Annual review of shortwave receivers. Listing of English shortwave broadcasts.

$17.50 postpaid (USA) (Book Rate)

ICOM R-70 You have read the details on this revolutionary receiver. It's getting rave reviews.

LIST $749
SALE $669

The Best just got Better

*Now EEB offers an EXCLUSIVE upgraded R-70 SWL with AM bandwidth of 6 and 2.3 KHz giving you that sharp filter for crowded band conditions. EEB now provides an extended 90 day warranty, effectively doubling your warranty; 6 months parts and labor at no cost to you.

G.E. WORLD MONITOR II

Best Buy under $250

SONY ICF 2001

Microcomputer and Synthesizer offer best value in its class. Features quartz crystal locked PLL frequency synthesizer and dual conversion super-heterodyne circuitry plus "standby-reception" capability. The microcomputer gives you four tuning methods: direct access, memory, autoscans, and manual tune. Much, much more.

LIST $349.00
SALE $299.00
NOW $209.95 HURRY! LIMITED SUPPLY

DA-100 D McKAY DYMELK

ALL WAVE RECEIVER ANTENNA

$50 off ($109.00) when purchased with any radio from EEB.

LIST $159
SALE $139
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 subreflector (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 sparkles 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 upper 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 Arsenide 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 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 infra-red 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 one'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.

Your own satellite
TV system for $1,800.00
10 FT. PARABOLIC

What the system will do:
You can receive up to 60 channels of T.V. direct from satellites to your home receiver. Movies, sporting events, religious programs, other T.V. stations, and much more.

What the system includes:
1. 10 ft. fiberglass dish made of reflective metal bond with fiberglass. Weather-resistant and virtually maintenance-free. Dish comes in 4 sections.
2. Single pedestal heavy duty polar mount for extra strength and installation simplicity; easy satellite to satellite adjustment.
3. Four pole rotator mount for more stability, square tube legs and rotator included.
4. All aluminum LNA mount and horn holder for accurate aiming of LNA. All aluminum, weather-proof LNA cover.
5. Auto-Tech. ChapparelFeed Horn for unsurpassed quality.
6. All accessories included.

CALL US TODAY! 901-795-4504

TENNESSEE ELECTRONICS
P.O. BOX 181108
MEMPHIS, TENNESSEE 38118

Circle 21 on Reader Service Card

www.americanradiohistory.com
**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.

<table>
<thead>
<tr>
<th>Time</th>
<th>Station</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>Radio Sofia, Bulgaria</td>
<td>9.700, 11.720</td>
</tr>
<tr>
<td></td>
<td>REE, Spain</td>
<td>11.800</td>
</tr>
<tr>
<td></td>
<td>Radio Beijing, China</td>
<td>11.670, 15.120, 15.520</td>
</tr>
<tr>
<td></td>
<td>Radio Japan</td>
<td>15.300, 17.825</td>
</tr>
<tr>
<td></td>
<td>Radio Kiev, Ukrainian SSR</td>
<td>9.685, 11.790, 15.100, 15.240</td>
</tr>
<tr>
<td></td>
<td>Radio Havana Cuba</td>
<td>11.930, 11.760</td>
</tr>
<tr>
<td></td>
<td>Voice of Israel</td>
<td>7.410, 9.815, 11.655</td>
</tr>
<tr>
<td></td>
<td>Voice of Nicaragua</td>
<td>5.955</td>
</tr>
<tr>
<td></td>
<td>BRT, Belgium</td>
<td>9.880</td>
</tr>
<tr>
<td></td>
<td>BBC, London</td>
<td>11.750, 15.260</td>
</tr>
<tr>
<td>0100</td>
<td>TGNA, Guatemala</td>
<td>3.300</td>
</tr>
<tr>
<td></td>
<td>Radio Belize</td>
<td>3.285</td>
</tr>
<tr>
<td></td>
<td>Swiss Radio International</td>
<td>6.135</td>
</tr>
<tr>
<td></td>
<td>Voice of Germany, W. Germany</td>
<td>6.404, 6.085, 6.145, 11.865</td>
</tr>
<tr>
<td></td>
<td>BBC, London</td>
<td>6.175</td>
</tr>
<tr>
<td></td>
<td>Radio Canada International</td>
<td>9.535</td>
</tr>
<tr>
<td></td>
<td>BRT, Belgium</td>
<td>7.465</td>
</tr>
<tr>
<td></td>
<td>Radio Prague, Czechoslovakia</td>
<td>5.930</td>
</tr>
<tr>
<td></td>
<td>Voice of Greece</td>
<td>9.865</td>
</tr>
<tr>
<td></td>
<td>RAI, Italy</td>
<td>9.575</td>
</tr>
<tr>
<td></td>
<td>Radio Bucharest, Roumania</td>
<td>5.990</td>
</tr>
<tr>
<td>0200</td>
<td>Radio Cairo, Egypt</td>
<td>9.475, 12.000</td>
</tr>
<tr>
<td></td>
<td>Radiobras, Brazil</td>
<td>15.290, 17.830</td>
</tr>
<tr>
<td></td>
<td>BBC, London</td>
<td>9.765</td>
</tr>
<tr>
<td></td>
<td>Radio Netherlands</td>
<td>9.590, 6.165</td>
</tr>
<tr>
<td></td>
<td>RBI, E. Germany</td>
<td>11.920</td>
</tr>
<tr>
<td></td>
<td>Radio Sweden</td>
<td>9.696, 11.705</td>
</tr>
<tr>
<td></td>
<td>Radio Beijing</td>
<td>11.650, 15.120, 15.520</td>
</tr>
<tr>
<td></td>
<td>Radio Japan</td>
<td>15.195, 17.825</td>
</tr>
<tr>
<td></td>
<td>Radio Polania, Poland</td>
<td>6.095, 6.135, 9.525, 11.815, 15.120</td>
</tr>
<tr>
<td></td>
<td>Voice of Free China, Taiwan</td>
<td>11.740</td>
</tr>
<tr>
<td>0300</td>
<td>Radio Canada International</td>
<td>9.755</td>
</tr>
<tr>
<td></td>
<td>Radio Tirana, Albania</td>
<td>6.200, 7.120</td>
</tr>
<tr>
<td></td>
<td>Voice of Kenya</td>
<td>4.934</td>
</tr>
<tr>
<td></td>
<td>SRS, Surinam</td>
<td>4.850</td>
</tr>
<tr>
<td></td>
<td>Radio Cairo, Egypt</td>
<td>9.745</td>
</tr>
<tr>
<td></td>
<td>Radio Sweden International</td>
<td>9.695</td>
</tr>
<tr>
<td></td>
<td>Radio RSA, South Africa</td>
<td>11.730</td>
</tr>
<tr>
<td></td>
<td>Radio Portugal</td>
<td>6.025</td>
</tr>
<tr>
<td></td>
<td>RBI, East Germany</td>
<td>9.960</td>
</tr>
<tr>
<td></td>
<td>Voice of Free China, Taiwan</td>
<td>17.800</td>
</tr>
<tr>
<td></td>
<td>Radio Prague, Czechoslovakia</td>
<td>7.345</td>
</tr>
<tr>
<td></td>
<td>UAE Radio, United Arab Emirates</td>
<td>9.595, 11.755</td>
</tr>
<tr>
<td>0400</td>
<td>Radio Sofia, Bulgaria</td>
<td>7.115</td>
</tr>
<tr>
<td></td>
<td>Radio Uganda</td>
<td>5.026</td>
</tr>
<tr>
<td></td>
<td>Radio RSA, South Africa</td>
<td>9.585</td>
</tr>
<tr>
<td></td>
<td>Radio Beijing, China</td>
<td>11.650</td>
</tr>
<tr>
<td></td>
<td>Radio New Zealand</td>
<td>15.485</td>
</tr>
<tr>
<td></td>
<td>Radio Australia</td>
<td>17.895</td>
</tr>
<tr>
<td>0500</td>
<td>Radio Casino, Costa Rica</td>
<td>5.954</td>
</tr>
<tr>
<td></td>
<td>Radio Netherlands</td>
<td>6.165, 9.590</td>
</tr>
<tr>
<td></td>
<td>Radio Portugal</td>
<td>6.015</td>
</tr>
<tr>
<td></td>
<td>Voice of Nigeria</td>
<td>15.120</td>
</tr>
<tr>
<td></td>
<td>HCJB, Ecuador</td>
<td>6.095, 11.910</td>
</tr>
<tr>
<td></td>
<td>UAE Radio, United Arab Emirates</td>
<td>17.700</td>
</tr>
<tr>
<td></td>
<td>Voice of Israel</td>
<td>9.815</td>
</tr>
<tr>
<td></td>
<td>Radio Japan</td>
<td>15.325</td>
</tr>
<tr>
<td></td>
<td>Voice of Nigeria</td>
<td>7.255</td>
</tr>
<tr>
<td></td>
<td>Vatican Radio</td>
<td>9.645</td>
</tr>
<tr>
<td>0600</td>
<td>HCJB, Ecuador</td>
<td>6.095, 11.915</td>
</tr>
<tr>
<td></td>
<td>RBI, East Germany</td>
<td>6.080</td>
</tr>
<tr>
<td></td>
<td>GBC, Ghana</td>
<td>3.350, 4.915</td>
</tr>
<tr>
<td></td>
<td>SLBC, Sierra Leone</td>
<td>5.980</td>
</tr>
<tr>
<td></td>
<td>Radio Cook Islands</td>
<td>11.760</td>
</tr>
<tr>
<td></td>
<td>ELWA, Liberia</td>
<td>4.765</td>
</tr>
<tr>
<td>0700</td>
<td>HCJB, Ecuador</td>
<td>6.130, 11.925</td>
</tr>
<tr>
<td></td>
<td>Papua New Guinea</td>
<td>9.520</td>
</tr>
<tr>
<td></td>
<td>Radio RSA, South Africa</td>
<td>11.900</td>
</tr>
<tr>
<td></td>
<td>KYOI, Saipan</td>
<td>11.900</td>
</tr>
<tr>
<td></td>
<td>KTWR, Guam</td>
<td>11.840</td>
</tr>
<tr>
<td>0800</td>
<td>GBC Guyana</td>
<td>5.950</td>
</tr>
<tr>
<td></td>
<td>Radio Malaysia</td>
<td>6.175, 9.750, 15.295</td>
</tr>
<tr>
<td></td>
<td>Radio New Zealand</td>
<td>11.960, 15.485</td>
</tr>
<tr>
<td></td>
<td>SIBC, Solomon Islands</td>
<td>9.545</td>
</tr>
<tr>
<td></td>
<td>KYOI, Saipan</td>
<td>15.190</td>
</tr>
<tr>
<td></td>
<td>GBC, Ghana</td>
<td>5.950</td>
</tr>
<tr>
<td></td>
<td>VLV9, Australia</td>
<td>9.610</td>
</tr>
<tr>
<td>0900</td>
<td>TWR, Monaco</td>
<td>9.495</td>
</tr>
<tr>
<td></td>
<td>Radio Japan</td>
<td>9.505</td>
</tr>
<tr>
<td></td>
<td>FEBC, Philippines</td>
<td>11.890</td>
</tr>
<tr>
<td></td>
<td>BBC, London</td>
<td>9.510</td>
</tr>
<tr>
<td>1000</td>
<td>Radio Korea, S. Korea</td>
<td>9.570</td>
</tr>
<tr>
<td></td>
<td>Radio Australia</td>
<td>5.955</td>
</tr>
<tr>
<td></td>
<td>KYOI, Saipan</td>
<td>11.900</td>
</tr>
<tr>
<td></td>
<td>Radio New Zealand</td>
<td>11.960</td>
</tr>
<tr>
<td>1100</td>
<td>Radio Polania, Poland</td>
<td>11.840</td>
</tr>
<tr>
<td></td>
<td>Radio Singapore</td>
<td>11.940</td>
</tr>
<tr>
<td></td>
<td>Radio Pakistan</td>
<td>11.670</td>
</tr>
<tr>
<td></td>
<td>Voice of Vietnam</td>
<td>10.080</td>
</tr>
<tr>
<td></td>
<td>Radio Pyongyang, N. Korea</td>
<td>9.977</td>
</tr>
<tr>
<td></td>
<td>BBC, London</td>
<td>17.775</td>
</tr>
<tr>
<td>1200</td>
<td>Radio Australia</td>
<td>5.955, 6.045, 9.710, 17.795</td>
</tr>
</tbody>
</table>

*Note: For a complete listing, please visit [www.americanradiohistory.com](www.americanradiohistory.com)*
INFO-TECH M200-F
TRI-MODE CONVERTER

$495.00

Converts Morse & RTTY (Baudot & ASCII) to video, and serial Baudot or ASCII for hard copy

Morse reception: 6-55 wpm standard (simple user adjustment for higher speeds). Automatic speed tracking & word space adjustment. RTTY/ASCII Operation. Decodes RTTY (45, 50, 57, 74, 100 Baud) and ASCII (110 & 300 Baud). Auto CR/LF, automatic threshold control, selectable unshift on space. Limiter is switch selectable, solid state tuning meter. Demodulator has 3 fixed shifts and 1 tunable shift, user selectable printer outputs in ASCII or Baudot for all modes with crystal control baud rate generator RS232. TTL & isolated loop outputs. User adjustable autostart.

- Video Display Formats: up to 25 lines of 72 characters
- Built-in 115/230v power supply

Contact Us for Further Information and Name of Your Nearest Dealer

INFO-TECH ELECTRONIC EQUIPMENT

Manufactured by
DIGITAL ELECTRONIC SYSTEMS, INC.
1833 Wisteria Court * Englewood, Florida 33533

MADE IN U.S.A.
813-4749518
CIRCLE 5 ON READER SERVICE CARD

WHAT EVERY LISTENING STATION NEEDS

$59.95

Includes loop antenna and built-in preamplifier with 1 MHz and 100 kHz crystal calibrator. 15 - 30 MHz coverage

APARTMENT DWELLERS, TAKE NOTE!

THE NEW NXL-1000 NOISE-CANCELLING INDOOR SHORTWAVE ANTENNA

Now you can pull in signals all over the world without erecting an outside antenna! The new NXL-1000 uses a shielded loop (one foot in diameter, located on the top of the unit) and a built-in preamplifier to offer performance comparable to a long wire antenna. In addition, the shielded loop inherently cancels man made noise, and it can be tilted and turned to null out interfering noise sources. Also, as an added bonus, the NXL-1000 comes with a crystal calibrator built-in, a must for calibration of nondigital receivers. It all adds up to this: no shortwave listening station is complete without the NXL-1000 - the "Superloop."

CONTEMPORARY ELECTRONIC PRODUCTS
P.O. Box 570549
Miami, Florida 33157
(305) 255-7660
DEALERS WANTED

CIRCLE 31 ON READER SERVICE CARD
July 1983 / POPULAR COMMUNICATIONS / 27
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 2 1/2" x 1 1/2" x 1 1/4". 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 cryptography 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.


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 condenser 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 4 1/4" high x 2 1/2" wide and 15/16" deep. Controls include Push-to-Talk/VOX switch; VOL/HI-Med-Low switch; MIC/HI-Med-Low 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, building maintenance operations, and on construction sites.

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 Transector 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.

Transector’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.
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, Mircrowave 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 Bellfontaine 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.

THE MONITORING MAGAZINE
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 POPCOMM 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 possibilities for Survivalists seeking communications licenses.

**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 who 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 on 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 subscription from the First Church of the Sacred Framms. 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 Services are a group of services which have potential 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 association 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 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 civilian 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 because in its present stage of evolution, it is far better suited to use for experimental hobby communications via CW than it 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.
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 POPCOMM. All of the frequencies are MHz.

### American Breweries

<table>
<thead>
<tr>
<th>Brewery Name</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anheuser Busch Inc.</td>
<td>KZ4565</td>
</tr>
<tr>
<td>Clayton, MO</td>
<td>WKZ515</td>
</tr>
<tr>
<td>Columbus, OH</td>
<td>KXX660</td>
</tr>
<tr>
<td>Deering, ND</td>
<td>KJS306</td>
</tr>
<tr>
<td>Dubuque, IA</td>
<td>WST462</td>
</tr>
<tr>
<td>Houston, TX</td>
<td>KL2292</td>
</tr>
<tr>
<td>Indianapolis, IN</td>
<td>KL2292</td>
</tr>
<tr>
<td>Indianapolis, IN</td>
<td>KLR591</td>
</tr>
<tr>
<td>Lafayette, IN</td>
<td>WYGY539</td>
</tr>
<tr>
<td>Manteno, NC</td>
<td>KJH666</td>
</tr>
<tr>
<td>Merrimack, NH</td>
<td>KFY93</td>
</tr>
<tr>
<td>Moorhead, MN</td>
<td>KL2292</td>
</tr>
<tr>
<td>Newark, NJ</td>
<td>KHH946</td>
</tr>
<tr>
<td>Oakwood, MO</td>
<td>KCL873</td>
</tr>
<tr>
<td>St. Louis, MO</td>
<td>KL2292</td>
</tr>
<tr>
<td></td>
<td>KA61095</td>
</tr>
<tr>
<td></td>
<td>KFC230</td>
</tr>
<tr>
<td></td>
<td>KRD464</td>
</tr>
<tr>
<td></td>
<td>KS3179</td>
</tr>
<tr>
<td></td>
<td>WRX340</td>
</tr>
<tr>
<td></td>
<td>KBR329</td>
</tr>
<tr>
<td></td>
<td>KAL520</td>
</tr>
<tr>
<td></td>
<td>KFM736</td>
</tr>
<tr>
<td></td>
<td>KRIJ209</td>
</tr>
<tr>
<td></td>
<td>KWE921</td>
</tr>
<tr>
<td></td>
<td>KYE652</td>
</tr>
<tr>
<td></td>
<td>WQC838</td>
</tr>
<tr>
<td></td>
<td>WQD921</td>
</tr>
<tr>
<td></td>
<td>KA65520</td>
</tr>
</tbody>
</table>

### Blitz-Weinhard Co. Portland, OR

WQC838 158.46

### Cerveceria Corona Inc. Santeurce, PR

WQD921 462.25

### (Adolph) Coors Co. Golden, CO

KA65520 158.43
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.

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 allocates 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.

MIZUHO AP-1D Audio Processor...

WHAT IS AN AUDIO PROCESSOR?

The AP-1D Audio Processor picks up signals from sounds received through the speaker or headphone of the receiver or transceiver. The signals are deciphered, processed and reproduced automatically for improved SN by narrowing the bandwidth. This process is called an audio processor. AM, BCL, SSB and CW operators all agree that the results are outstanding.

SPECSIFICATIONS

Dimensions and Weight
W200 x H168 x D153mm 1.1 kg

Filter
- Narrow band-pass filter (PEAK) 500-1000Hz variable
- Band-pass filter (BAND PASS) 600-1500Hz fixed
- Narrow band attenuator (NOTCH) 600-3000Hz variable

Input impedance and level 2.5K ohm
- 30dB (RX 8 ohm SP terminal can be connected)
Output impedance and power supply 8 ohm 0.9W
Power Supply DC 13.5V 150mA

Selectivity
A Narrow band-pass filter. Over 25dB at 1 oct relative to the center frequency
B Band-Pass filter. Out-band attenuation 1 oct, over 10dB

$99.50

Order today direct or from HENRY RADIO (800) 421-6631. To order direct include $3.00 shipping/handling. From California add sales tax. VISA/MC orders welcome. We will pay shipping/handling charge for all prepaid orders. No C.O.D. PLEASE.

ACE communications, Inc. 2832 D WALNUT AVENUE TUSTIN CALIFORNIA 92680 714/544-8281 TELEX 665-308

THE MONITORING MAGAZINE CIRCLE 27 ON READER SERVICE CARD
Y '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 formidable 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 S1 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 (peak) adjustments. Capacitor C1 is for loading and electrically lengthening the antenna, while the other, C2, 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 coil, L1, is wound as shown in the pictorial of the coil. Note that the small holes are drilled 1/4" 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 (S1). 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.
shortwave receiver should or that they screw spring you ammeter that they might make it yourself, mount the base against a good ground, make certain that there is a good ground connection to the receiver (such as a cold water pipe). If the rod you have on your location, but it will drain off any static charges 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 feed-in enters. Be certain that the length of the antenna feed-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 S₁ 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 C₁ and C₂ 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 S₁ 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.

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 feed-in.
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 afternoon, 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 was 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 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 Mediterranea in Malta over the Deutsche Welle relay transmitters there. Now there's one in Morocco. Radio Mediterranea 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 'h' 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-
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 österreichischen Bundesheers) 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 5.100.

7. Away from South America and over in the land of blondy, try the “sorta pirate” Radio Dublin on 6.910. 0300 onwards is probably the best time to log this one and east coasts 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 Santo Domingo, 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!

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 (KA0 PPO) in Colomba, 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 work up digital displays. 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, you do have 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.

Albany 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 (RNAG) heard in Spanish at 0300 to 0310 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
YOU AIN'T HEARD NOTHIN' YET!

CRB Research, the pioneer communications data publisher, offers the serious scanner monitor and communications receiver owner many unique and exciting frequency reference publications covering federal agencies (military and civilian), aero frequencies, energy industry frequencies, and most other things you want to monitor.

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

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

CRB RESEARCH
P.O. Box 56
Commack, NY 11725

---

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 to 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 Clarín, 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 Révolution 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 17.690; 0530 to 0600, 1000 to 1030, 1200 to 1300, 2000 to 2100, and 2200 to 2330 on 15.585; 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 11.655; 0500 to 0530 on 11.675; 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 09.440; 0500 to 09.440; 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) NHK 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 on 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

---

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.
over the transmitters of Radio Moscow. (Editor)

Marinas 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 Super-ock-KYOI, Saipan," also using Japa-

nese; also heard on 9.670 at 1815. (Mac-

kenzie, CA)

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

kenzie, CA)

Netherlands Radio Netherlands in Arabi-

on on 9.895 at 1645. (Mackenzie, CA) Ra-

dio 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 Ameri-

can. (Slaughter, PA)

Netherlands Antilles Radio Nether-

lands from Bonaire heard with the "Happy Station" program on 21.685 at 0230 to 2120; also heard on 17.695 and 15.560 from Bonaire and on 15.220 from the Mad-

gascar relay station. (Mackenzie, CA)

New Zealand Radio New Zealand heard on 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 identi-

fication at 1643. (Mackenzie, CA)

Nigeria The Voice of Nigeria's West Afri-

can Service is heard at extremely strong levels on 7.255 from its sign on at 0500. How-

ever, the transmitter modulation is some-

what 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 Represen-

tatives. (Mackenzie, CA)

Philippines The Voice of America relay sta-

tion 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 Eng-

lish at 0000, mixing with Radio Japan on the same frequency. (Mackenzie, CA)

Singapore The BBC Far East Relay sta-

tion has been observed on 9.740 with news and the program "Meridian" at 1700. (Mac-

kenzie, 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 9.780. (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 Interna-

tional observed at 0425 on 11.715 with in-

terval 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)

tain The Voice of Free China heard with a broadcast in Mandarin on 15.225 to 0455 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. (Ho-

muth, 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, 9.615, 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, Interna-

tional Broadcasting Services, Ltd.; Penns Park, Pennsylvania; George Osier, Norfolk, New York; Michael J. Prose, Ridgeway, Pennsylvania; Robert C. Homuth, Phoe-

nix, Arizona; Stewart Mackenzie, Hunting-

ton Beach, California; Shawn Jerin, Tampa, Florida; Dennis Bernstein, Arlington, Massachusetts; V.J. Anzyske, East Haven, Connecticut; Robert Larson, Senior, Hec-

tor, Minnesota; Joe Gregan, 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

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, 146.000-146.505, 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 electricity, 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 handle-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 hams operating 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 N2DJP 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 N2DJP." 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 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.

<table>
<thead>
<tr>
<th>29.300-29.700 MHz</th>
<th>29.300-29.500</th>
<th>29.520-29.580</th>
<th>29.600</th>
<th>29.600-29.680</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amateur radio satellites</td>
<td>Repeater inputs (20 kHz spacing)</td>
<td>Simplex</td>
<td>Repeater outputs (20 kHz spacing)</td>
<td></td>
</tr>
<tr>
<td>146.010-146.385</td>
<td>146.400-146.490</td>
<td>146.400-146.600</td>
<td>146.520</td>
<td>146.610-146.985</td>
</tr>
<tr>
<td>147.000-147.390</td>
<td>147.400-147.490</td>
<td>147.420-147.570</td>
<td>147.600-147.700</td>
<td>147.800-147.970</td>
</tr>
</tbody>
</table>

ARRL Band Plans

<table>
<thead>
<tr>
<th>50-54 MHz</th>
<th>50.000-50.080</th>
<th>50.080-50.100</th>
<th>50.100-50.500</th>
<th>50.200</th>
<th>50.500-50.0400</th>
<th>52.490-52.510</th>
<th>52.525</th>
<th>53.1, 53.2, 53.3, 53.4, 53.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CW and beacons</td>
<td>CW</td>
<td>CW, SSB, AM</td>
<td>National calling frequency</td>
<td>FM and FM repeaters</td>
<td>Simplex</td>
<td>National simplex frequency</td>
<td>Radio control</td>
<td></td>
</tr>
<tr>
<td>420-450 MHz</td>
<td>420.000-426.000</td>
<td>426.000-432.000</td>
<td>432.000-432.070</td>
<td>432.070-432.080</td>
<td>432.090-432.100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>144-145 MHz</th>
<th>144.000-144.050</th>
<th>144.050-144.060</th>
<th>144.060-144.100</th>
<th>144.100-144.200</th>
<th>144.200</th>
<th>144.200-144.300</th>
<th>144.300-144.500</th>
<th>144.500-144.600</th>
<th>144.600-144.900</th>
<th>144.900-145.100</th>
<th>145.100-145.200</th>
<th>145.200-145.500</th>
<th>145.500-145.800</th>
<th>145.800-146.000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moonbounce CW</td>
<td>Propagation beacons</td>
<td>CW and low power</td>
<td>Moonbounce and low power SSB</td>
<td>National calling frequency</td>
<td>SSB</td>
<td>New OSCAR satellite sub-band</td>
<td>Linear translator inputs</td>
<td>Linear translator outputs</td>
<td>FM repeater inputs for 145.2-145.5</td>
<td>Low power and FM simplex</td>
<td>Linear translator outputs</td>
<td>FM repeater outputs for 144.6-144.9</td>
<td>OSCAR satellite sub-band</td>
<td></td>
</tr>
<tr>
<td>442.000-445.000</td>
<td>445.000-447.000</td>
<td>447.000-449.900</td>
<td>449.000-452.000</td>
<td>452.000-454.000</td>
<td>454.000-456.000</td>
<td>456.000-458.000</td>
<td>458.000-460.000</td>
<td>460.000-462.000</td>
<td>462.000-464.000</td>
<td>464.000-466.000</td>
<td>466.000-468.000</td>
<td>468.000-470.000</td>
<td>470.000-472.000</td>
<td></td>
</tr>
</tbody>
</table>

Repeater inputs for 146.61-146.985
Repeater outputs for 147.4-147.49
Simplex
National simplex frequency
Repeater outputs for 146.01-146.385 (15 kHz channel spacing)
Repeater outputs for 146.7-147.99 (15 kHz channel spacing)
Repeater inputs for 146.4-146.49
Simplex
Amateur television repeater or simplex (421.25 kHz video carrier), control links, experimental
Amateur television simplex (427.25 kHz video carrier frequency)
Moonbounce
Propagation beacons
Low power CW
Calling frequency
Miscellaneous and low power
OSCAR satellite inputs
Miscellaneous and low power
Auxiliary and repeater links
Satellites only (international)
Amateur television repeater inputs (439.250 kHz video carrier) and repeater links
Repeater inputs and outputs
Auxiliary and control links, repeaters and simplex
Miscellaneous and experimental
National simplex frequency
OSCAR satellite sub-band
OSCAR satellite inputs
Miscellaneous and low power
Auxiliary and repeater links
Satellites only (international)
Amateur television repeater inputs (439.250 kHz video carrier) and repeater links
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 unininitiated, 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..."
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!

---

**Coming Soon In**

**POPULAR COMMUNICATIONS**

- Guerrilla Communications in El Salvador
- DXing The Feds On Shortwave
- Directory Of DX Programs
- The World's First High Seas Pirate Broadcasters (50th Anniversary)
- Build A Broadcast Band PreAmp
- Scanning American Airlines

---

**LISTEN UP!**

Here's what you've been looking for—an all new hard-hitting monthly magazine which gives a unique insider's view of what's really going on in the world of communications. POP' COMM is your primary source of information—bigger and better than any communications magazine, with exciting coverage of scanners, shortwave broadcast & utility stations, spy stations, pirate and clandestine broadcasters, RTTY monitoring, survivalist communications systems, FCC news, wiretapping and bugging, voice scrambling/unscrambling, surveillance/undercover communications, satellite & cable TV, sophisticated telephones, & more. What you've been looking for all along! Take advantage of substantial savings over the newsstand price by subscribing now. Don't miss out on even one single issue of POPULAR COMMUNICATIONS—order your subscription now.

**SUBSCRIBE NOW & SAVE!**

**POPULAR COMMUNICATIONS** 76 N. Broadway, Hicksville, NY 11801

Yes! The **NEW POPULAR COMMUNICATIONS** is just the magazine I've been looking for. Start sending it to me now! I understand that I may cancel at any time for any reason, and receive a full refund on my unused subscription.

Paid by: [ ] Check [ ] Money Order [ ] MasterCard [ ] Visa

<table>
<thead>
<tr>
<th>Name:</th>
<th>[ ] Check [ ] Money Order [ ] MasterCard [ ] Visa</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>State</td>
</tr>
</tbody>
</table>

**A Great Gift Idea**

Send the following gift subscription to my friend at my expense. Please indicate your name above. A gift card will be sent.

Paid by: [ ] Check [ ] Money Order [ ] MasterCard [ ] Visa

<table>
<thead>
<tr>
<th>Name:</th>
<th>[ ] Check [ ] Money Order [ ] MasterCard [ ] Visa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street</td>
<td>[ ] Check [ ] Money Order [ ] MasterCard [ ] Visa</td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
</tbody>
</table>

---

**THE MONITORING MAGAZINE**

July 1983 / POPULAR COMMUNICATIONS / 49

Visit our website: www.americanradiohistory.com
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. 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 the 12 GHz signal has a wavelength 1/3 of 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.

---

**North American Ku-Band Satellites**

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

* Dual-Band satellites

Four primary spot beams provide regional coverage for Anik C3.
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 GSTAR I 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-1986. 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.

---

To preserve your copies of **POPULAR COMMUNICATIONS**

A choice of handsome and durable library cases or binders for your copies of **POPULAR COMMUNICATIONS**. Both styles bound in dark blue library fabric stamped in gold leaf.

**Cases:** Each case hold 12 issues. Price per case $5.95; three for $17.00; six for $30.00, postpaid.

**Binders:** Each binder holds 12 issues. Issues open flat. Price per binder $7.50; three for $21.75; six for $42.00, postpaid.

(Canadian and foreign requests should also include an additional $2.50 per item for shipping costs.)

To: Jesse Jones Industries (Since 1843)
P.O. Box 5120, Dept. P-Com, Philadelphia, PA 19141

I enclose my check or money order for $_____.

Please send me _____ POPULAR COMMUNICATIONS

☐ Files. ☐ Binders. Please allow approximately 4 weeks for delivery.

(Please Print)

Name ____________________________

Address __________________________

City _____________________________

State ____________________________

Zip _______________________________

52 / POPULAR COMMUNICATIONS / July 1983

---

**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 SPC'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 transponders will be equipped with 16 watt TWTAs and provide coverage of between 45 dBW at boresight to around 39 dBW at beam edge. Several Ku-Band transponders will be used to relay SPC'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.

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 are due to be reviewed 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.
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 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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-1</td>
<td>Signal weak</td>
</tr>
<tr>
<td>10-2</td>
<td>Signal strong</td>
</tr>
<tr>
<td>10-3</td>
<td>Stop transmitting</td>
</tr>
<tr>
<td>10-4</td>
<td>OK</td>
</tr>
<tr>
<td>10-5</td>
<td>Relay to ____</td>
</tr>
<tr>
<td>10-6</td>
<td>Busy</td>
</tr>
<tr>
<td>10-7</td>
<td>Out of service</td>
</tr>
<tr>
<td>10-7R</td>
<td>Out of service at residence</td>
</tr>
<tr>
<td>10-7R</td>
<td>Permanent Dead</td>
</tr>
<tr>
<td>10-8</td>
<td>In service</td>
</tr>
<tr>
<td>10-9</td>
<td>Repeat message</td>
</tr>
<tr>
<td>10-10</td>
<td>No</td>
</tr>
<tr>
<td>10-11</td>
<td>_____ is on duty</td>
</tr>
<tr>
<td>10-12</td>
<td>Standby or stop</td>
</tr>
<tr>
<td>10-13</td>
<td>Existing conditions</td>
</tr>
<tr>
<td>10-14</td>
<td>Message information</td>
</tr>
<tr>
<td>10-15</td>
<td>Message delivered</td>
</tr>
<tr>
<td>10-16</td>
<td>Reply to message</td>
</tr>
<tr>
<td>10-17</td>
<td>En route to ____</td>
</tr>
<tr>
<td>10-18</td>
<td>Urgent</td>
</tr>
<tr>
<td>10-19</td>
<td>In contact</td>
</tr>
<tr>
<td>10-20</td>
<td>Location</td>
</tr>
<tr>
<td>10-21</td>
<td>Call by landline</td>
</tr>
<tr>
<td>10-21I</td>
<td>Call by landline (immediately)</td>
</tr>
<tr>
<td>10-22</td>
<td>Disregard</td>
</tr>
<tr>
<td>10-23</td>
<td>Arrived at scene</td>
</tr>
<tr>
<td>10-24</td>
<td>Assignment completed</td>
</tr>
<tr>
<td>10-25</td>
<td>Return to ____</td>
</tr>
<tr>
<td>10-26</td>
<td>Estimated time of arrival is ____</td>
</tr>
<tr>
<td>10-27</td>
<td>License or permit information</td>
</tr>
<tr>
<td>10-28</td>
<td>Ownership information</td>
</tr>
<tr>
<td>10-29</td>
<td>Records check</td>
</tr>
<tr>
<td>10-30</td>
<td>Danger, use caution</td>
</tr>
<tr>
<td>10-31</td>
<td>Pick up ____</td>
</tr>
<tr>
<td>10-32</td>
<td>_____ units needed</td>
</tr>
<tr>
<td>10-33</td>
<td>Time check</td>
</tr>
<tr>
<td>10-34</td>
<td>Intoxicated person</td>
</tr>
<tr>
<td>10-35</td>
<td>Advise if ____ available for call</td>
</tr>
<tr>
<td>10-36</td>
<td>Does not conform to regulations</td>
</tr>
<tr>
<td>10-37</td>
<td>Advise road/weather conditions</td>
</tr>
<tr>
<td>10-38</td>
<td>Stations involved acknowledge</td>
</tr>
<tr>
<td>10-39</td>
<td>Motor vehicle accident</td>
</tr>
<tr>
<td>10-40</td>
<td>Holding suspect, rush reply</td>
</tr>
<tr>
<td>10-41</td>
<td>Need ambulance</td>
</tr>
<tr>
<td>10-88</td>
<td>Package for ____</td>
</tr>
<tr>
<td>10-89</td>
<td>_____ is calling you</td>
</tr>
<tr>
<td>10-97</td>
<td>Request for radio check</td>
</tr>
<tr>
<td>10-99</td>
<td>Emergency at this station!</td>
</tr>
</tbody>
</table>

**Pennsylvania Statute Codes**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>601</td>
<td>Driving without valid license</td>
</tr>
<tr>
<td>2501</td>
<td>Criminal homicide</td>
</tr>
<tr>
<td>2502</td>
<td>Murder</td>
</tr>
<tr>
<td>2701</td>
<td>Simple assault</td>
</tr>
<tr>
<td>2702</td>
<td>Aggravated assault</td>
</tr>
<tr>
<td>2705</td>
<td>Reckless endangerment</td>
</tr>
<tr>
<td>2706</td>
<td>Terroristic threats</td>
</tr>
<tr>
<td>2709</td>
<td>Harassment</td>
</tr>
<tr>
<td>2901</td>
<td>Kidnapping</td>
</tr>
<tr>
<td>3121</td>
<td>Rape</td>
</tr>
<tr>
<td>3125</td>
<td>Corrupting a minor</td>
</tr>
<tr>
<td>3127</td>
<td>Indecent exposure</td>
</tr>
<tr>
<td>3301</td>
<td>Arson</td>
</tr>
<tr>
<td>3304</td>
<td>Criminal mischief</td>
</tr>
<tr>
<td>3502</td>
<td>Burglary</td>
</tr>
<tr>
<td>3503</td>
<td>Criminal trespass</td>
</tr>
<tr>
<td>3701</td>
<td>Robbery</td>
</tr>
<tr>
<td>3714</td>
<td>Reckless driving</td>
</tr>
<tr>
<td>3731</td>
<td>Drunk driving</td>
</tr>
<tr>
<td>3732</td>
<td>Vehicular homicide</td>
</tr>
<tr>
<td>3926</td>
<td>Theft of services</td>
</tr>
<tr>
<td>401</td>
<td>Forgery</td>
</tr>
<tr>
<td>4015</td>
<td>Bad checks</td>
</tr>
<tr>
<td>4905</td>
<td>Filing false police report</td>
</tr>
<tr>
<td>4912</td>
<td>Impersonating a police officer</td>
</tr>
<tr>
<td>5501</td>
<td>Riot</td>
</tr>
<tr>
<td>5503</td>
<td>Disorderly conduct</td>
</tr>
<tr>
<td>5504</td>
<td>Crank telephone calls</td>
</tr>
<tr>
<td>5505</td>
<td>Public drunkenness</td>
</tr>
<tr>
<td>5506</td>
<td>Loitering/prowling</td>
</tr>
<tr>
<td>5902</td>
<td>Prostitution</td>
</tr>
<tr>
<td>6308</td>
<td>Drinking by minor</td>
</tr>
</tbody>
</table>

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.
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.


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.


11. Antarctica Radio Nacional Archange: 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 International on 11.770 at 0104 with end of music segment. There was a man in Spanish with station identification.


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


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 Nederland Relay on 6.165 at 0206. In Spanish. Very strong as it should be.


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


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


32. Argentina Radiodifusion Argentina el Externo (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 insular 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.


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!


40. Philippines Far East Broadcasting Company on 11.890 at 0958 with woman talking, man with identification “This is BEFC Radio International” gave frequencies and interval signal.

41. Haiti Radio 4VEH on 11.835 at 1107 with man in English and religious sermon. Co-channel QRM.

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


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.


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.


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?


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.


60. Ascension BBC Relay on 15.260 at 1532 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 Jamahiriya on 11.815 at 2250 with man talking in English. Poor level.

63. Malta Radio Mediteranean. 6 110 at 2258 Rock music, news in French. Only fair on this recent move from 5.960 which was better.


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

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

69. Brazil Radio Renascence, 11.730 2328 with tone, chimes, interval signal, and identification in Portuguese.

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.


73. Poland Radio Polonia, 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.


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


79. French Guiana 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.


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

83. Ethiopia Voice of Revolutionary Ethiopia, 7.110 suddenly on at 0336 (listed for 0330 sign on), weak in unidentified language under CW QRM.


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.


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 Bafousam, 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 0610. 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.


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


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, 0600 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 chattering 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 Iceland 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 18 hours— the ears hurt, the mind sweats, 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 gracefully 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, being 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 feel 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 SuperAntenna 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

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 NEW HORIZONS

Dept. PC7, 1 Penn Plaza, Suite 100
New York, NY 10119

www.americanradiohistory.com
THE EXCITING WORLD OF RADIOTELETYPE MONITORING

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 interferences. 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 of 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 to and suitable equipment is 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 points 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.

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" 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.
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 drop out; 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 1573, 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!

---

**Table: TASS - Telegraphiole Agenstvo Sovetskogo Sotsia: The Official Soviet Press**

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>Location</th>
<th>Time (GMT)</th>
<th>Language</th>
<th>Time Shift (Hz)</th>
<th>Baudot Rate (baud)</th>
<th>Normal/Reverse Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>22791.0</td>
<td>Moscow, USSR</td>
<td>1300</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>22782.0</td>
<td>Moscow, USSR</td>
<td>1000</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>20965.0</td>
<td>Moscow, USSR</td>
<td>1420</td>
<td>Arabic</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>20585.0</td>
<td>Moscow, USSR</td>
<td>1330</td>
<td>French</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>19830.0</td>
<td>Moscow, USSR</td>
<td>1400</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>19235.0</td>
<td>Moscow, USSR</td>
<td>1315</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>19105.0</td>
<td>Moscow, USSR</td>
<td>1500</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>18870.0</td>
<td>Moscow, USSR</td>
<td>1600</td>
<td>French</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>18540.0</td>
<td>Moscow, USSR</td>
<td>1250</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>18385.0</td>
<td>Moscow, USSR</td>
<td>0600</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>18160.0</td>
<td>Moscow, USSR</td>
<td>0500</td>
<td>RY’s</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>17570.0</td>
<td>Moscow, USSR</td>
<td>0700</td>
<td>French</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>17510.0</td>
<td>Moscow, USSR</td>
<td>1300</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>17370.0</td>
<td>Moscow, USSR</td>
<td>0530</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>17360.0</td>
<td>Moscow, USSR</td>
<td>1300</td>
<td>Arabic</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>16260.0</td>
<td>Moscow, USSR</td>
<td>1230</td>
<td>French</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>16150.0</td>
<td>Moscow, USSR</td>
<td>1800</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>14880.0</td>
<td>Moscow, USSR</td>
<td>1300</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
<tr>
<td>14700.0</td>
<td>Moscow, USSR</td>
<td>1330</td>
<td>English</td>
<td>425 Hz</td>
<td>50 baud</td>
<td>Reverse</td>
</tr>
</tbody>
</table>
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 AirResearch 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 2½" 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.

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 Egyptian 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").
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 is also 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 excerpted 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!
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., Dear 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 Service 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 to 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, 952.375, 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 926, 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 952.6125 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, 416, 151, 453, 462, 497, and 825 MHz band to test products for immunity to RFI.

KM2XKE, Sierra Research Corp., West-ern, 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 of conductive aluminum pads. Under 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. The 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.

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 inter-service 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 would 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 approval 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 identity 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, the extension of the notification 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 comments 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 comments 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. Noted that Part 18 equipment will be reviewed under a separate rule-making in Docket No. 20718.

The following is a summary of proposed changes in the category of equipment authorization:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Wildlife tracking transmitters Ocean buoy tracking and telemetry transmitters</td>
<td>Type acceptance</td>
<td>Notification</td>
</tr>
<tr>
<td>15</td>
<td>Receivers from 30 to 890 MHz excluding superregenerative receivers, TV and FM broadcast receivers and scanners</td>
<td>Type acceptance</td>
<td>Notification</td>
</tr>
<tr>
<td>21</td>
<td>Fixed point-to-point microwave transmitters</td>
<td>Certification</td>
<td>Notification</td>
</tr>
<tr>
<td>73</td>
<td>AM antenna phase monitors</td>
<td>Type approval</td>
<td>Notification</td>
</tr>
<tr>
<td>74</td>
<td>Broadcast transmitters</td>
<td>Type acceptance</td>
<td>Notification</td>
</tr>
<tr>
<td>78</td>
<td>Fixed point-to-point microwave transmitters</td>
<td>Type acceptance</td>
<td>Notification</td>
</tr>
<tr>
<td>94</td>
<td>All microwave transmitters</td>
<td>Type acceptance</td>
<td>Notification</td>
</tr>
</tbody>
</table>

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 auxiliary 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 structures concerns. There may be alternative regulatory approaches in some cases, which can provide essential control with fewer constraints on technological innovation. All of these 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 license 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 wide-use, multi-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 technical 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 continue.
Demonstration
the regulatory
choices, function. Deregulation increases
standards, said, has
ify
on private radio channels
were
such
volved, more
plicated
ognized
the specified
permitted
strengths.
191, released August
ulations are not necessarily
their
The
tions probably would occur gradually, but
ue
while interference control is a valid and
essential government function, existing reg-
ulations 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
gain roll-off. The rules 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 control-
ing interference potential, transmitter output
power limits may not be needed, and their
elimination would permit greater flex-
ibility in system design.
Still less constraining would be direct reg-
ulation of coverage areas and field
strengths. Any combination of ERP and an-
tenna 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 rec-
ognized that both calculation and measure-
ment of field strength can present complica-
ted problems and that they may not be
suitable for all services.
Where new, unoccupied channels are in-
volved, 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 speci-
ify 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. Com-
ment 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, communi-
cations sales organizations, and others for
the purpose of demonstrating equipment,
conducting propagation studies, and per-
forming field strength surveys. These li-
censes were normally granted in the Bus-
iness Radio Service to utilize itinerant-use
frequencies. Licensees were also authorized
to conduct these activities on frequencies as-
signed for their regular day-to-day business
communications. In addition, these entities
were usually able to obtain licenses in the Ex-
perimental 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 fol-
lowed 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 pur-
suant to such licenses must be completed
within a two week period. Any frequency al-
located for use in a Part 90 radio service may
be used provided that the technical lim-
itations applicable to regular use of that fre-
quency are observed. Also, there are areas
where bands of frequencies cannot be as-
sign, e.g., in zones where prior coordin-
ation 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 limita-
tions imposed upon bands of frequencies
and all special limitations applicable to dis-
crete frequencies contained in the various
subparts of Part 90 of the rules.
The prospective licensees (those for
whom the demonstration or survey is per-
formed) must prepare and file a complete
application, which includes establishing el-
gibility and compliance with the frequency
coordination procedures, if required. A val-
id license must be obtained from the Com-
mision 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 main-
tain 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.

USA-CA
Order one or two today
and start collecting
counties for one of
amateur radio's
most prized awards,
USA-CA. $1.25

POPULAR COMMUNICATIONS
76 N. Broadway, Hicksville, NY 11801
Please rush me copies of the USA-CA Record Book.
Enclosed is $1.25 for each record book.
Total Enclosed
Name
Address
City State Zip

THE MONITORING MAGAZINE
July 1983 / POPULAR COMMUNICATIONS / 65
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), re-leasing 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 co-channel 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.

THE FABULOUS KENWOOD R-2000 ... MADE EVEN BETTER BY UNIVERSAL!

While the R-2000 offers everything the average listener would want, it is lacking one key feature for the serious DXer ... infinite tuning resolution. The "stock" R-2000 has a tuning resolution of only 50 Hz. If you listen (or plan to listen) to Morse Code, Radiotelegraphy or Facsimile you will require a feature called R.I.T. Receive Incremental Tuning offers very precise (fine) tuning which is important for the non-voice modes. Universal has used the space formerly occupied by the tone control for the R.I.T. control. A color matched decal is used to cover the tone control indication. This and other R-2000 modifications made by our Kenwood-trained technicians. We are fully authorized sales & service center for Kenwood, Yaesu, Drake, JRC, ICOM and other fine lines.

R-2000 List Price...............$599.95
Universal Price.............$47.95
Universal Price with R.I.T. $79.95

For more SWL info. write:
Universal Amateur Radio
F. Osterman - SWL Dept.
1280 Aida Drive
Reynoldsburg, OH 43068
Phone: 614 866-4267

Please add $9.00 for handling, insurance & UPS shipping.

Ohio Residents add 5.5% sales tax.
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 3574.7 (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!

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 use these frequencies, 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 arrrange 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.

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)


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 Item 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; KI570, 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 Spencer 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: UF3M, Neveisk, 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 6SC 6ZSC DE 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 "dahs" and slight 3-4 second burst 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. Not at 1410-1650 and 2100-2200. (no name on report)

7500: VNG, Lyndhurst, Victoria, Australia, AM time signals 1314. (Robert Homuth, AZ)

7511.7: "IN" 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: JIJ, Tokyo, Japan, AM time signals 1259. (Robert Homuth, AZ)

8449: BPO, 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)

---

NQU - SIPE STATION

This confirms reception

US NAVAL SUPPORT FORCES - ANTARCTICA

ZME

Utility QSLs. (Courtesy SPEEDX)

---

AGAR 21

This Confirms Reception of the United States Air Force

EC-135N

---

68 / POPULAR COMMUNICATIONS / July 1983

THE MONITORING MAGAZINE

www.americanradiohistory.com
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: “05R,” 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)

12754.5: 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!

DON’T MISS OUT ON A SINGLE ISSUE OF

Everyone interested in amateur radio needs his own copy of CQ.
To read, to save, to refer to. Order your subscription now.

Fill out the coupon below. (Please print)

The Radio Amateur’s Journal
76 North Broadway, Hicksville, NY 11801

Please send me CQ for ☐ Life ☐ 3 Years ☐ 2 Years ☐ 1 Year
This is a ☐ Renewal ☐ New Subscription Starting With ☐ Issue.

Rates (check one)

<table>
<thead>
<tr>
<th>USA</th>
<th>VE/XE</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>$42</td>
<td>$48</td>
<td>$54</td>
</tr>
<tr>
<td>$29</td>
<td>$33</td>
<td>$37</td>
</tr>
<tr>
<td>$16</td>
<td>$18</td>
<td>$20</td>
</tr>
</tbody>
</table>

Account Number

Name

Street

City State or Country Zip

P.O. Box 540

orders accepted 24 hours a day by: ☐ Check ☐ Money Order ☐ VISA ☐ MasterCard

www.americanradiohistory.com
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 inaccuracies 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 defense of this type of legislation will be greatly appreciated. For further information, please contact: The Legal Department, Electrolet, 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 Ric 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

THE MONITORING MAGAZINE

SCANNER CRYSTALS!

America's leading mail-order supplier!

Let Z-Tech Enterprises be your prime source of precision scanner crystals. We are specialists in crystals for federal frequencies, public safety, aero band, business/industrial, maritime. Shipped to you factory fresh and ready to zero in on the stations you want to hear. Low prices, too! We'll be pleased to send you our special order form offering the best prices you've ever seen for precision custom-cut scanner crystals. Just ask us for it!
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 harassment, 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 Electrical, Inc.
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 RFing 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 taped songs 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 Go-tin” 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 POPCOMM 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 WDTD 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.

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, WTD. 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 Voyager, 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 30007 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 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 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 I do not use foul language. I think 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 Ops Bn USAFSA, CMR Box 1912, APO New York 09458. Till next month, 73's, 88's, and FFF!... de Al

THE MONITORING MAGAZINE
July 1983 / POPULAR COMMUNICATIONS / 73
**BOOK SHOP**

**POPULAR COMMUNICATIONS**

- **The Complete Security Handbook** — for home, office, car, boat, RV, anything by C.A. Roper

  If you've ever worried about your home or vehicle being burglarized, this book has the answers you need. An all-inclusive source on how to determine your security needs, buy the right systems and devices, and install them. Includes alarm systems to protect your home, vehicles, and other property against fire, smoke, lightning, vandalism, theft, gas, water leaks, and more. 540 pages, 681 illustrations, paperback, $13.95. Order #T194.

- **World-Wide Radioteletype Call Sign List**

  Some 3000 call signs of RTTY and CW stations located in all parts of the world. Starts out at AAAAUSA and goes to ZYK and beyond—through the numerical prefixes from 3AC to 9YM. Handy directory for identifying unknown RTTY and CW transmitters on international frequencies. $6.00. Order #U201.

- **World Press Services Frequencies**

  by Thomas Harrington

  A comprehensive manual covering the field of radiotele-type news monitoring—antennas, receivers, terminal units, monitors, and more. Contains 3 master lists of times of transmission, frequencies, plus ITU list of over 50 news services worldwide. 72 pages, paperback, $5.95. Order #U173.

- **Amateur Radio, Super Hobby**

  by Vince Luciani, K2VJ

  A complete source of information on what amateur radio is. How to get started in amateur radio, some of the theoretical mathematics, plus exclusive on-the-air lives of some members of the amateur radio community. 144 pages, paperback, $8.95. Order #C168.

---

**TABLE**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>ORDER #</th>
<th>TITLE</th>
<th>PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Shipping charges $2.00 per order. Shipping charges waived on orders of $50.00 or more. Books shipped best way. All orders are processed the day they are received, but please allow 30 days for delivery within North America.

**Book Total**

**Shipping Charge**

**Grand Total**

---

**THE MONITORING MAGAZINE**

**POPULAR COMMUNICATIONS**

76 N. Broadway, Hicksville, NY 11801

Order Date: 

Name: 

Address: 

City: 

State: 

Zip: 

☐ Check ☐ MasterCard ☐ VISA

Card No. _______________________________ Expires _______________________________

X

Signature required on all charge orders:

---

www.americanradiohistory.com
COMMUNICATIONS SHOP

ADVERTISING RATES: Non-commercial ads are 30 cents per word including abbreviated and addresses, minimum charge $6.00 per issue. Ads from firms offering commercial products or services are $1.00 per word, minimum charge $20.00 per issue. Leading key words set in all caps at no additional charge. All classified ads must be prepaid in full at time of insertion, a 5% discount is offered for prepaid & time insertions. All ads must be typewritten double spaced.

APPROVAL: All ad copy is subject to Publisher’s approval and may be modified to eliminate refer- ence to equipment and practices which are either illegal or otherwise not within the spirit or cover- age scope of the magazine.

CLOSING DATE: The 10th day in the third month preceding date of publication. Because the adver- tisers and equipment contained in Communications Shop have not been investigated, the Publisher of Popular Communications cannot vouch for the merchandise listed therein. Direct all correspondence and ad copy to: PC Communications Shop, 76 N. Broadway, Hicksville, NY 11801.

ELECTRONIC SPYING is the name of the game. It’s also the title of a startling book which reveals the closely guarded methods & equipment used by professionals & amateurs who eavesdrop on homes & businesses with (sometimes) legal and (usually) illegal bugs & wiretaps. Written in non-technical language everyone can easily understand, ELECTRONIC SPYING has photos & illus- trations showing exactly how they do it & where they get the equipment (much of it inexpensive & easily available). Leaves nothing to the imagination! Latest techniques covered & offers an in-depth wealth of infor- mation on the ever increasing electronic inversion un- available from any other source. This book is used by law enforcement agencies as a reference manual. Only $7.95 (plus 50¢ postage) per copy from CRB Research, P.O. Box 56, Commack, N.Y. 11725.

SCANNER CRYSTALS! America’s leading mail order specialist, sent to you postpaid and factory fresh! Lowest prices anywhere, we can’t even print them here! Send for free catalog and special order form! 2-Tech, P.O. Box 70, Hauppauge, NY 11788.

SCANNER OPERATORS! Are you registered? Be as- signed your own personal monitoring ID letters inscribed on beautiful 2-color bordered certificate. plus discounts and gadgets! Thousands already registered! Only $5.00, ppd. from CRB Research, Box 56PC, Commack, N.Y. 11725.

WORLD’S MOST UNUSUAL Communications Books! A large selection of outstanding titles covering scanners, “confidential” frequency registries, bugs, wiretapping, covert communications, espionage, monitoring, and more! New titles being added constantly! Ask for our FREE catalog CRB Research, Box 56-PC, Commack, NY 11725.

SURVIVAL! Tom Kneitel’s new National Directory of Survival Radio Frequencies! Unique book reveals the 5,000 most required radio frequencies 179 kHz to 470 MHz. State police, forestry, CD, highway maintenance, fish/game disaster, EMS, military, flood control, Indian Reservations, Air Army National Guard, fed/state pris- ons, ports/airports/bases, clear channel broadcasting, severe weather, and lots more. National & state-by-state listings. An absolute must for every Survivalist and con- cerned citizen. A concise/handy key to knowing what’s going on around you during a disaster or crisis, or for lis- tening right now to hear what’s taking place behind the scenes. Only $7.95 by First Class Mail from CRB Re- search, P.O. Box 56, Commack, NY 11725.

ELECTRONIC SURVEILLANCE: Incredible manual. Homebrew Bugging Outlines wiretapping, bugs, and other techniques used by professional operatives. (Sche- matics included— $15.00). We also have manuals on remote control, covert communications, survival, weap- onry, exotic alarm systems, countermeasures and more. Send $3.00 for catalog. A.T.S., Dept. R, Box 4068, Dearborn, MI 48126.


TRANS COMPUTER DISCOUNTS—DMP 100 printer $314.95, DC modem $129.95. Color graphic printer $199 Full RS 90 day warranty. Spectrum Projects, 931 15th Dr. SW, Woodstock, NY 11421. For fast de- livery, call (212) 441-2807.

"RAIL SCAN" by Tom Kneitel. New scanner frequency directory; Largest & most comprehensive guide to the ever expanding electronic invasion unavailable from any other source. This book is used by law enforcement agencies as a reference manual. Only $7.95 (plus 50¢ postage) per copy from CRB Research, P.O. Box 56-PC, Commack, NY 11725.


RTTY HEADQUARTERS: All your RTTY needs. Dealers for "HAL" and "INFO-TECH" products. You can’t beat our prices! Call or write Dick, DIALTA Amateur Radio Supply, 212 - 48th Street, Rapid City, SD 57701. (605) 434-6127.

SURVIVALISTS/ Affiliate with the oldest/largest in- ternational network of 27 MHz SSB communications users. You read about us in the April ’83 POPCOMC’s Su- rvival column. Receive your own personal SSB member- ship ID number, wall certificate, special operating/fre- quency information & lots more for only $8. Ask us for free info & application (no obligation)— send long SASE to: The SSB Network, P.O. Box 908-PC, Smithtown, NY 11787.

FREQUENCY LIST AND GUIDES: Confidential government, weather, ships, coastal; aircraft, World Press services, and more. Identifies shortwave stations, covers 3 to 30 MHz. RTTY, SSB, CW, FAX. Send for free list of these up to date confidential publications. Universal Electronics, 1280 Aida Drive, Reynoldsburg, OH 43068.

HUNDREDS OF GREAT ELECTRONIC construction projects and courses. 50 page color catalog $3.00, with 3 hour audio cassette dramatization $6.00. Don Britton Enterprises, P.O. Drawer G, Honolulu, HI 96815.


ATTENTION SCANNER OWNERS: Handbook for po-lice scanning. Includes police radio system operations, dispatch and patrol information. 10-Codes, etc. $3.99 ppd. WE Enterprises, Box 2621, Grand Junction, CO 81502.

THE MONITORING MAGAZINE

HEAR THE WORLD with Dymek Wide World Equipment

DA100D ANTENNA

A sturdy wide range all-wave receiving DA100D is the worldwide leader in high active antennas. Only 4½" tall, can be used effectively anywhere 110-240VAC or 100-130VDC are available. Sheds, buildings, balconies, mobile homes—Newly-designed inside control makes for easy operation. A simple OFF/ON switch prevents RF overload — just one of a dozen exclusive features! In use throughout the world. 

Frequency Coverage

50 kHz to 30 MHz

DA100DM Marine version

available with corrosion resistant adapter and fiberglass whip antenna for use on or near salt water. Ask for W-DA100 option.

DA8 LOOP ANTENNA

This improved shielded ferrite rod directional antenna is a top performer. Wide range amplifier 18 to 30000 kHz. Tunes out strong local interference! Even overcomes TV and other electrical disequilibria! Brings in AM signals with amazing clarity! Use indoor or outdoor antenna heads DLT through DWT. DL1: 18 - 55 kHz, DL2: 50 - 150 kHz, DL3: 150 - 500 kHz, DL4: 500 - 2000 kHz DWT: 2 - 30 MHz

Other DYMKE equipment includes the DB1 - Speaker, the DPM/D5/RFM/PA/PA Stacks & the DVM/RFM/PA, Dubbed "the world's smallest "PA"! 1221-4300 W. 29Th Street, Chicago, IL 60618

CABLE TV

Buy Direct & Save

SUPER SPECIALS

40 CHANNEL CONVERTER $29.50

40 W band Remote Remote Control $59.50

JERROLD 400 THE ULTIMATE CABLE TV CONVERTER $129.50

Send $5 for Complete Catalog

DIRECT VIDEO SALES P.O. Box 1329 JEFFERSONVILLE, INDIANA 47130 CALL 1-812-282-4768

CIRCLE 54 ON READER SERVICE CARD

www.americanradiohistory.com
COMMUNICATIONS SHOP

ARE YOU INTERESTED in English language transmissions on shortwave? International Listening Guide is for you. Send $50 to I.L.G. P.O. Box 34, Littleton, CO 80161 USA

NEW 1983 HOME SATELLITE TELEVISION HANDBOOK & BUYERS GUIDE tells everything, including programming information, installation, advice on choosing the right system for your needs, & budget, $10.00. H&G Homesat Services, Dept. P, Box 422, Seafood, NY 11783

CAN YOU? Trace anyone, anywhere, get unlisted telephone numbers, beat the lie detector and PSE, tail or ditch a tail, run a driver's license, property, credit and personal record checks, open virtually any lock or safe in a few seconds? Do you know what device listens thru most any wall, what exotic surveillance gear works and where to buy it at a savings of 30-500%, how to alter common objects into electronic surveillance gear, the 11 under-the-hood bugs, what (CIA) chemical lets you read thru envelopes, how to buy super cheap night vision devices, what countermeasures work and those that don't; how to defeat bug detectors, world-wide sources for exotic gear? One NBC reporter calls it "the most dangerous book ever published." How To Get Anything On Anybody. $29.95 & $34.00 handling. TOLL FREE 1-800-345-8112. In PA call 1-800-662-2444.


SHORTWAVE DXING. SHORTWAVE LISTENING, for information send S50 to SHORTWAVE, P.O. Box 3434, Littleton, CO 80161 U.S.A.

POLICE AND FIRE CODES computerized list $5.95, scanner crystals $3.95 postpaid. Specify make and model, guaranteed. Compucodes, 204 West Street, West Warwick, RI 02893.

SP600 $200.00, R90-A $200.00. Send SASE for list and description of other receivers for sale. Jack, 3560 Klameray, Boise, ID 83704.

225 TO 399.95 MHz (MILITARY AIRCRAFT) IN 3500 SYNTHESIZED CHANNELS. AN/GRC-168 is completely solid state, has digital tuning, current issue equipment, operates on 120 vac. 60 c.p.s. Excellent condition, ready to use. $550.00 + shipping. S.A.S.E. and $1 for prices and pictures of this and other current military communications equipment for sale to: Michael P. Murphy, 11621 Valle Vista Rd., Lakeside, CA 92037 (619) 561-2726.

POLICE-FIRE PATCHES ALL 50 STATES. DISCOUNT SCANNERS, CRYSTALS $2.94. Stamp for free catalog. Dever Communications, Rf 2, Box 277, Hot Springs, AR 71901.

EXPERIMENTER VLF-HF antenna preamp, coupler, trap, board and housing kits. Loranz-C RF-GRI boards, for info send 20¢ stamp; Burhans Electronics, 161 Grovesen St., Athens, O 45701.


"FREE SHIPPING" To 48 States—Bearcat-100 $298.49, Regency-810 $259.95, JLL-SX-200 $324.95, Icom-R70 $674.95, Yaesu FRG-7700 $439.95, ICF-6500W $189.95, Kenwood R-2000 $569.95, R-1000 $339.95, Panasonic also. Frequency directories, coax cable, antennas, microphones, much more. Same day shipping w/money order. Picture catalog $1.00 (refundable). GALAXY ELECTRONICS, BOX-1202, Akron, O 44309 (216-376-2402).

DESCRAMBLERS—Quality constructed and battery operated. They'll descramble any single inversion scrambled communication. Only $37.50 postpaid. Deluxe with built-in speaker, only $47.50. Immediate shipment. Spotlight Enterprises, Dept. PC, Box 3047, Greenville, NC 27834.

S.E.L. Inc.
912 West Touhy Avenue
Park Ridge, Illinois, 60068
Out of State Call 1-800-322-1327
In State Call 312-564-0104
C C D + Accepts Major Credit Cards
Complete package pictured, comes complete with all accessories:
- Control Box
- 60' Coax Cable
- Mounting Hardware
- Transformer
- Instructions
- 90 Day Warranty

CIRCLE 56 ON READER SERVICE CARD

COMMUNICATIONS SHOP

ALLEMANNIC MICROPHONE TV ANTENNA'S
1.9 to 2.5 GHz Frequency Range
50 db System Gain

Complete System (Rodd Style as pictured, 25 db Gain) $69.95
Complete System (Dish Style as pictured, 50 db Gain) $109.95

All systems come complete with accessory package:
- Control Box
- 60' Coax Cable
- Mounting Hardware
- Transformer
- Instructions
- 90 Day Warranty

S.E.L. Inc.
912 West Touhy Avenue
Park Ridge, Illinois, 60068
Out of State Call 1-800-322-1327
In State Call 312-564-0104
C C D + Accepts Major Credit Cards
Complete package pictured, comes complete with all accessories:
- Control Box
- 60' Coax Cable
- Mounting Hardware
- Transformer
- Instructions
- 90 Day Warranty

CIRCLE 56 ON READER SERVICE CARD

LISTEN TO WHAT YOU'VE BEEN MISSING!!
"ACTION MONITOR"

"Action Monitor" is an automatic recording device that easily connects between any radio and your own recorder. It turns any scanner, station monitor, or radio into a fully automatic communications recording system for less than $50.

For more information call 414-547-7987, or write J.L. Labs, P.O. Box 183, Wales, WI 53183.

CIRCLE 22 ON READER SERVICE CARD

Avanti Scanner Antenna Bargains!
AV810 Triband Base Station, 10' high. Makes a whole new world to hear $26.50
AV804M Triband Mobile heavy magnet mount, low profile appearance $27.50
Dual Band Mobiles & Unique Mountings available at very low prices.

Call now or write:
H.O. Valzah Co.
1140 Hickory Trail
Downers Grove, IL 60515 312/852-0472
CIRCLE 40 ON READER SERVICE CARD

Planning to move? Please let us know six weeks in advance so you won't miss a single issue of POPULAR COMMUNICATIONS

76 N. Broadway, HICKSVILLE, NY 11801

76 / POPULAR COMMUNICATIONS / July 1983

INDEX

AD

AEA/Adv. Elec. App. 15
Ace Communications 37
All Electronics 56
Amphasonic Electronics 71
Antenna Specialists 72
Automation Techniques 49
BMW 1
C Comm 59
CRB Research 42
Capri Electronics 21
Contemporary Electronic Pds. 27
DX Communications 71
Digital Electronic Systems 27
Direct Video Sales 75
EGE, Inc. 19
Electronic Equipment Bank 23
Electronic Specialists 21
Heath Co. 2
Hustler Communications 4
ICOM America, Inc. 49
J.C. Labs 76
Lewis Construction Co. 43
Long's Electronics 49
MFJ Enterprises, Inc. 33
Mail Order Express 43
McKay Dymek/Stoner Comm. 75
Pop Commm Book Shop 74
SBC Distributing 71
S.E. Corporation 43
SEI, Inc. 76
Tem Microwave 43
Tennessee Electronics 25
Triangle Engineering 5
Universal Amateur Radio 66
Universal Communications 6
Universal Electronics 76
Van Valzah Co. 76
Winn-Tenna 59
Z-Tech 71

About POP'COMM

Popular Communications magazine is a monthly consumer publication devoted to the user and prospective user of VHF Scanners, Short Wave Receivers, RTTY Receiving Equipment, Radar Detectors, Satellite TV, Sophisticated Telephone Devices and other related products. Our readers are intelligent, curious and eager to explore new ideas and products. To reach this dynamic audience with your advertising message, contact Jim Reilly, Associate Publisher, at (312) 824-2412 or Herb Pressman, Sales Manager, at (516) 681-2922.

www.americanradiohistory.com
Automation Techniques proudly introduces the GLS-800! It's designed to reflect our reputation for hatching remarkably advanced technology... to set tomorrow's standards... at affordable prices!

We don't farm out the manufacturing. Each component is produced and guaranteed by Automation Techniques. And this Great Little System is turnkey, user-convenient and offers more features for the money than any other total package:

- A single RG8 coaxial cable that carries all power and signals between receiver and downconverter.
- Automatic polarity seeking by our unique LNF (low noise feed).
- Full-function infrared wireless remote control.
- Built-in tunable terrestrial interference filter (TIF).

Sell the system that will have customers flocking to your door. Call us today for the Automation Techniques Master Distributor nearest you.

1-918-836-2584
Three ways to better "bird" watching!

A. "Build a Personal Earth Station for Worldwide TV Reception" A complete guide to design, operation, construction and maintenance of satellite TV systems. Review of basic television fundamentals as well as satellite transmission and reception also covered. .995

B. "Video Electronics Technology" In addition to satellite TV, this publication also takes you from the early days of TV to the present, with all the innovations that have come along the way. Other topics covered include amateur TV and TV troubleshooting. .10.95

C. "The World of Satellite Television" Covers everything you'll need to know about satellite TV including equipment selection, installation and troubleshooting. Programming on the "birds" as well as a liberal collection of maps, charts and photos is included. .895

CALL TOLL FREE
1-800-633-6461 or 1-800-633-3410
IN ALA. 1-800-292-8668 9 AM TIL 5:30 PM CST MONDAY THRU FRIDAY

Long's Electronics
MAIL ORDERS: P.O. BOX 11347 BIRMINGHAM, AL 35202 • STREET ADDRESS: 3131 4TH AVENUE SOUTH BIRMINGHAM, ALABAMA 35233
CALL OR WRITE FOR OUR FREE CATALOG

www.americanradiohistory.com