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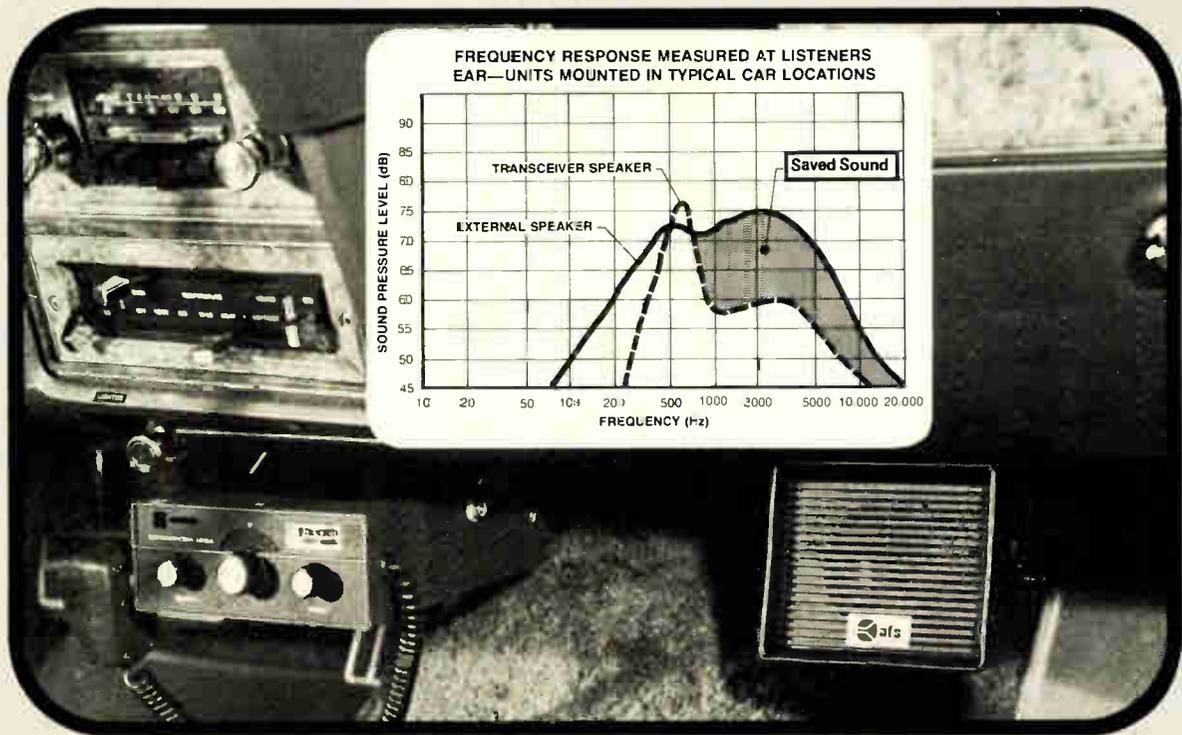
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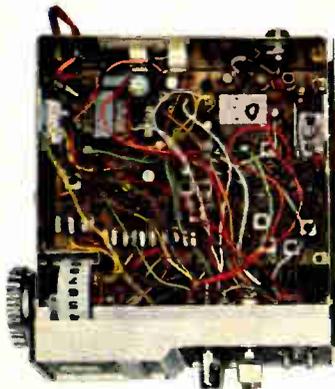
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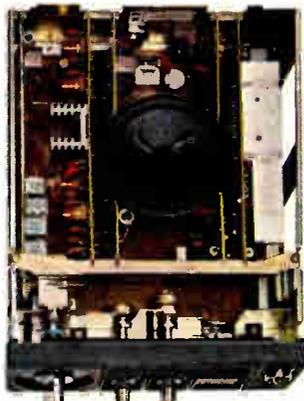


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COVER STORY

Cartoonist John Kane took several hours to produce our front cover, during which time he was off the air. Neighbors said it was the first time they had been able to watch the boob tube in 7 years!

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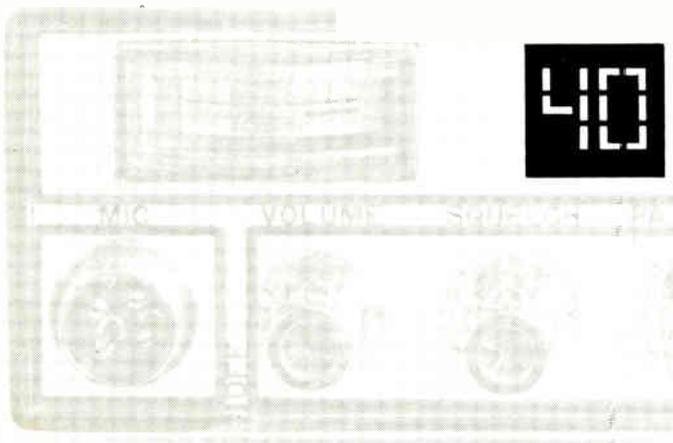
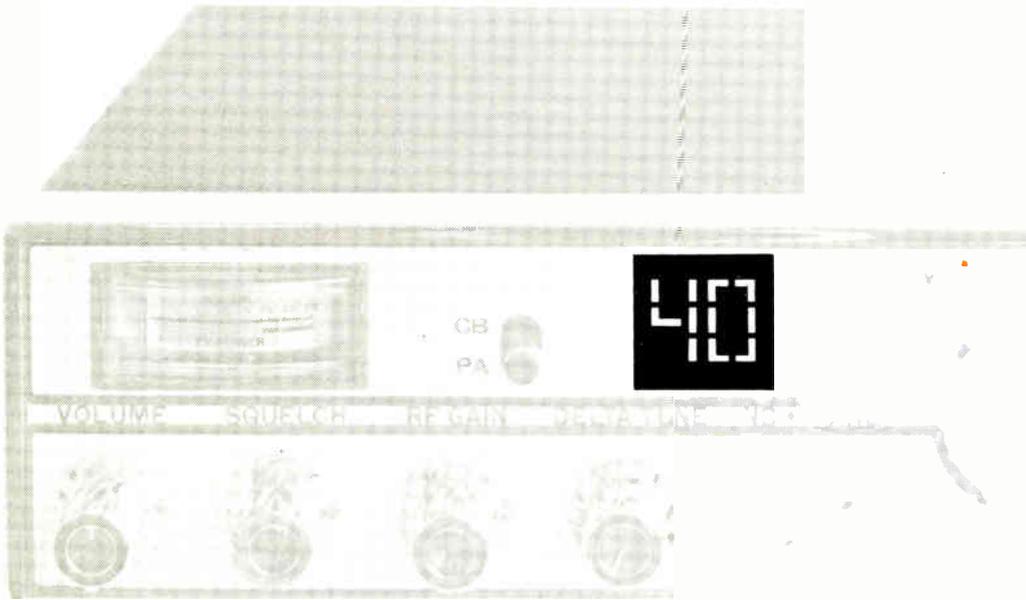
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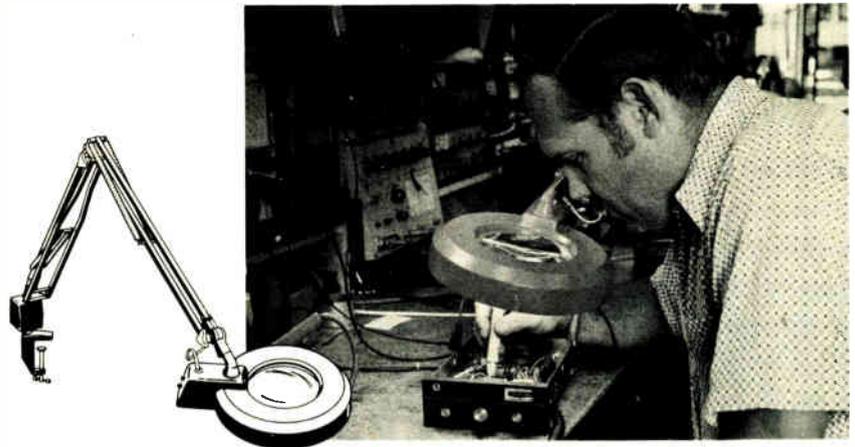
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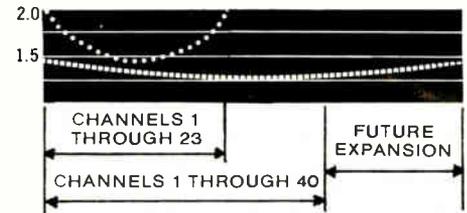
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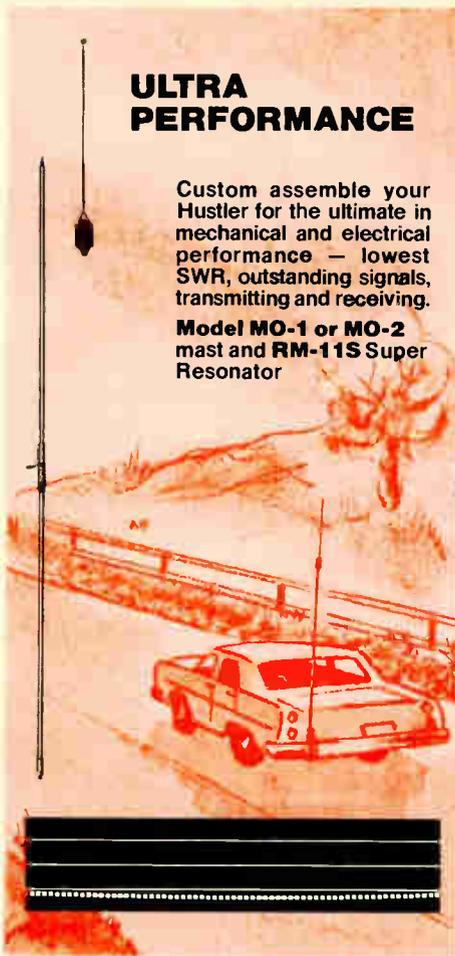
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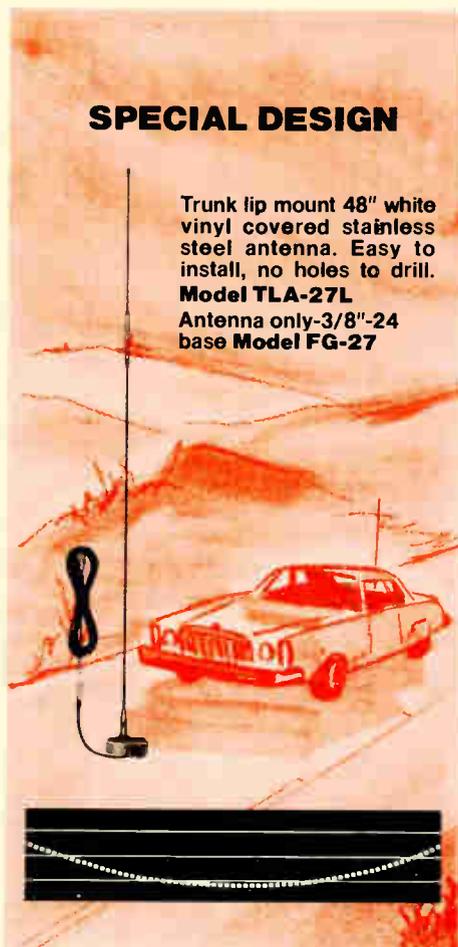
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Man dies, another wounded in 'dual' over CB radio use

One Citizens Band operator lay in a hospital bed in poor condition, another was dead and police were searching for a third man in a fight that began with two CB operators arguing over the airwaves.

Howard Collins, whose handle is "Dirty Bird," was reported in poor condition with gunshot wounds in the chest and abdomen in a Fort Worth hospital.

Don Hilcher, 36, of Fort Worth whose nickname was "Blue Goose," died when his bullet-riddled pickup slammed into a utility pole as he drove away from the spot where he and Collins had met to settle an argument.

And police are looking for the man who fired the shots into Hilcher's truck. No charges have been filed in the case.

Hilcher had asked Collins to stop monopolizing air time on a channel, police said. They said Collins apparently had been using a high powered radio and overlapped transmissions on other channels of the band.

Collins, who was operating at the time from his home, challenged Hilcher to a fight, and, according to a tape of the conversation given to police by another CB operator, Hilcher accepted.

What followed, said Haltom City Police Detective Bob Hurley, "was a combination of a little bit of booze and one man putting up a challenge that another man accepted."

Officers said Collins, 51, began driving around in his pickup talking with Hilcher trying to arrange a place to meet to settle their differences. Police said they were informed of the progress by some CB operators.

But others tried to hinder the police attempt to stop the fight.

Hurley said police units were unable to "get on top of the situation because other CBers were relaying our position."

Collins and Hilcher met beneath an overpass of the well-traveled Airport Freeway. The two got out of their trucks and began fighting in the road. While the men were fighting, police

Coast Guard Notes CB Radio Guidelines

Guidelines have been set by the Third Coast Guard District to assist organized groups that monitor Citizen Band (CB) radio for the purpose of relaying boating distress information.

"The Coast Guard has a primary responsibility for the safety of pleasure boat operators, many of whom have only CB radios for their boats," said Capt. Bernie E. Thompson, chief of staff for the Third Coast Guard District, in a letter being sent to the 40 Radio Emergency Assistance Communication Team (REACT) leaders and police departments in Connecticut, New York, New Jersey, Pennsylvania and Delaware.

It is considered necessary to provide guidelines to insure that a distress message gets through the various relay station unchanged. Thompson notes that the boater cannot communicate with the Coast Guard directly on CB because the Coast Guard does not monitor CB channels.

"Studies have determined that CB radio does not have adequately established and enforceable provisions to make it reliable enough for use in the boating safety service," he said. "We strongly urge the boating public to utilize established channels for marine mobile operations including distress traffic."

The Coast Guard has established an extensive network of radio transmitting and receiving stations on the VHF-FM marine mobile band. Coverage, in general, exists up to 20 miles offshore and includes complete coverage of large waterways such as Long Island Sound and Delaware Bay. The service maintains a continuous watch on channel 16

(156.8 MHz), the international distress and calling frequency.

"While we do not encourage the use of Citizen Band frequencies for marine distress traffic, we are obliged, in the interest of safe boating, to respond to boating distress reports broadcast over CB frequencies and relayed to the Coast Guard," said Lt. Fred N. Squires, Third District communications officer.

"Civilian radio organizations, such as REACT, can be of great help, particularly if the members are properly trained, have adequate equipment, and know what information is needed to permit effective Coast Guard response to a search and rescue call."

"It is necessary that this net control station be prepared to provide all required information on the reported distress," Squires continued. "While this relay function can be performed by telephone, its use for this purpose limits the Coast Guard response capability. During a search and rescue case, Coast Guard telephone lines can and do get very busy."

In order to carry out a successful search, the Coast Guard must have the following information from vessels or boaters requiring assistance: name of vessel; radio call sign; hull number of the distress boat; position (latitude and longitude preferred); is the vessel in immediate danger?; nature of assistance required; an accurate description of the boat (size, type, hull color, trim color); number of people on board; radio frequencies available; name of owner/operator, home port and telephone number; name and phone number of original contact for confirmation and call backs.

said, shots were fired. Collins fell to the ground. Hilcher sprinted to his pickup and drove away.

As he drove down an access road, the unidentified gunman fired several shots at the departing truck, police said.

Tarrant County Medical Investigator T. R. Harris said Hilcher died from multiple gunshot wounds. The windshield and rear window of his truck had been shot out.

Hurley said one gun, a pistol, had been found at the scene. He said he had interviewed some of the four to six

people known to be present when the shooting occurred. He is also planning to call in local CB operators to see if voices on tapes of transmissions prior to the fight could be recognized in hopes of identifying the gunman.

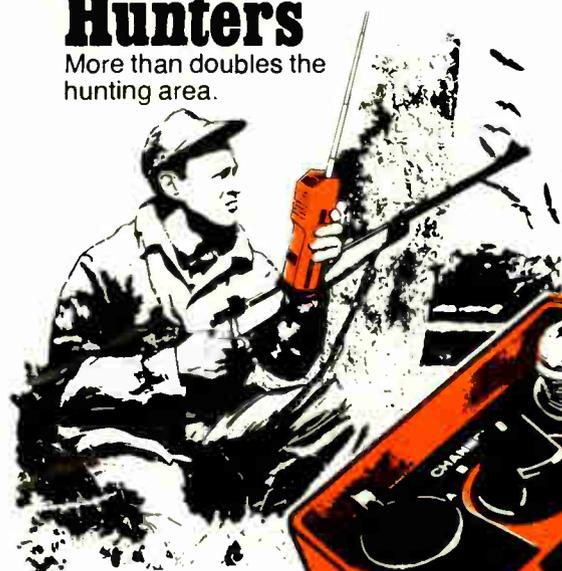
"One thing led to another," said a woman CB operator who listened to the exchange on the radio. "We tried to stop it. We figured it would lead to trouble, but we figured it would lead to a fist fight. Damnation, I never figured they would have guns out there."

She asked not to be identified.

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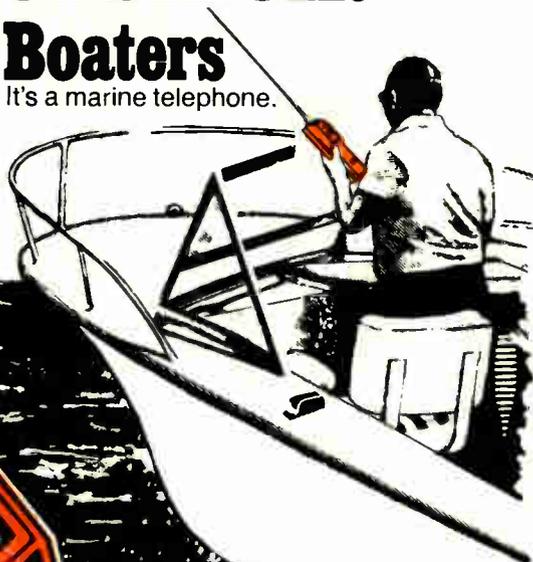
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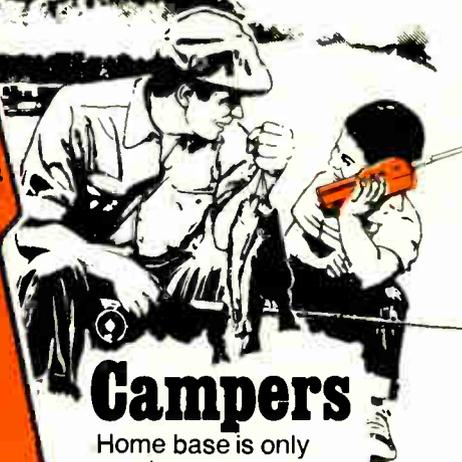
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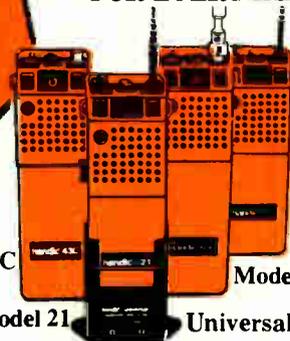
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That's the citizens' band radio "handle" for a San Jose, Cal., housewife and mother named Carol who has become a national highway legend.

Little Red, with her kitchen CB radio, leads truckers entering the Central Coast to obscure addresses to deliver their cargoes, warns them of traffic obstacles and maps out alternate routes.

And if there's trouble on the freeways, she alerts the proper agency.

But she doesn't give out her full name, address or phone number.

"I don't think it's good practice. I don't like the idea of going out and meeting them," she said. "The way I see it, the two-way radio was invented to help people, and if I can help them to save time, keep their schedules and report on any accidents or problems on the freeways when they are driving in this area, then that's great."

Indeed, with her maps, phone book and telephone ever at the ready, Little Red makes life far easier for truckers arriving in the valley from across the country and probably has saved thousands of dollars in lost time and confusion for them and their employers.

The name Little Red relates to Carol's size.

"I got the handle because I've got red hair and I'm 4 foot 11," she explained. "That's my height, not my width."

Truckers praised her service at a recent San Jose restaurant dinner in her honor.

"Green Goddess," "Silver Bullet," "Lady Thunder," and "Diamond Chip" all told how she had saved lives by telephoning the police when one of the truckers spotted an accident.

Little Red has been providing the free service for the past 10 years.

As for the truckers who sing her praises—"These turkeys on Channel 20 are the best there is—they are all fantastic."

Shady Lady Solicits Kentucky Truckers

Truck drivers tuned to CB radios know her as Shady Lady. That's the "handle" of a young woman.

She cruises the interstates around this Ohio River city and uses her car's CB mike to solicit 10-minute interludes with truckers at a charge of about \$25.

Shady Lady said she knows of no other woman in the area "working" from CB radios, although she's heard of others elsewhere in the country.

Shady Lady, in her early 20s, said that for the past months, she's earned a living entirely with her CB. She said she averages at least 10 customers, all truckers, on a dusk-to-dawn shift. And she reports earnings as high as \$500 a night and works five nights a week, taking weekends off.

Shady Lady says she worked a lot of hotels and truck stops before discovering the ease of getting business via CB radio. Working with the CB has kept

her out of trouble with the law, a relief from the hassles she had to endure on the hotel circuit, she said.

"This is Shady Lady," she begins. "Give me a break on channel 19 for a southbound smokey report." A smokey report in CB terminology is a report on the presence of police vehicles on the road.

When a trucker answers, Shady Lady said, he usually asks, "Where are you going tonight?"

"I'm headed for Cincinnati," she'll say. "You want to pull over for a cup of coffee?"

"Sure," the trucker responds. "How much does the coffee cost?"

Then the driver describes his rig and they agree to meet at the nearest stopping place. She said she usually arrives first, watches him pull in, walks over and identifies herself. A lot of truckers are repeat customers, she says.

Community watch at Hudson Lake, Ind.

A group of residents from Hudson Lake have organized a group to assist neighbors and friends in the protection of life and personal property through the use of CB Radio.

Community Watch began in May of last year in which members are assigned to a house watch and regular patrols of Hudson Lake each night. They especially want to look after and protect the elderly.

Or, watch over property of those who are away on summer vacation, or those summer residents who need to have their property patrolled during the winter. Time and gas are all donated by the members of Community Watch.

Several residents are completing an American Red Cross First Aid Course on Saturday, ready to be of assistance in event any accident or emergency condition occurs while they are patrolling the area.

Knowing standard first aid and being at the right place at the right time with the right training could be the difference between life or death, according to Ted Getz, instructor for the class from the

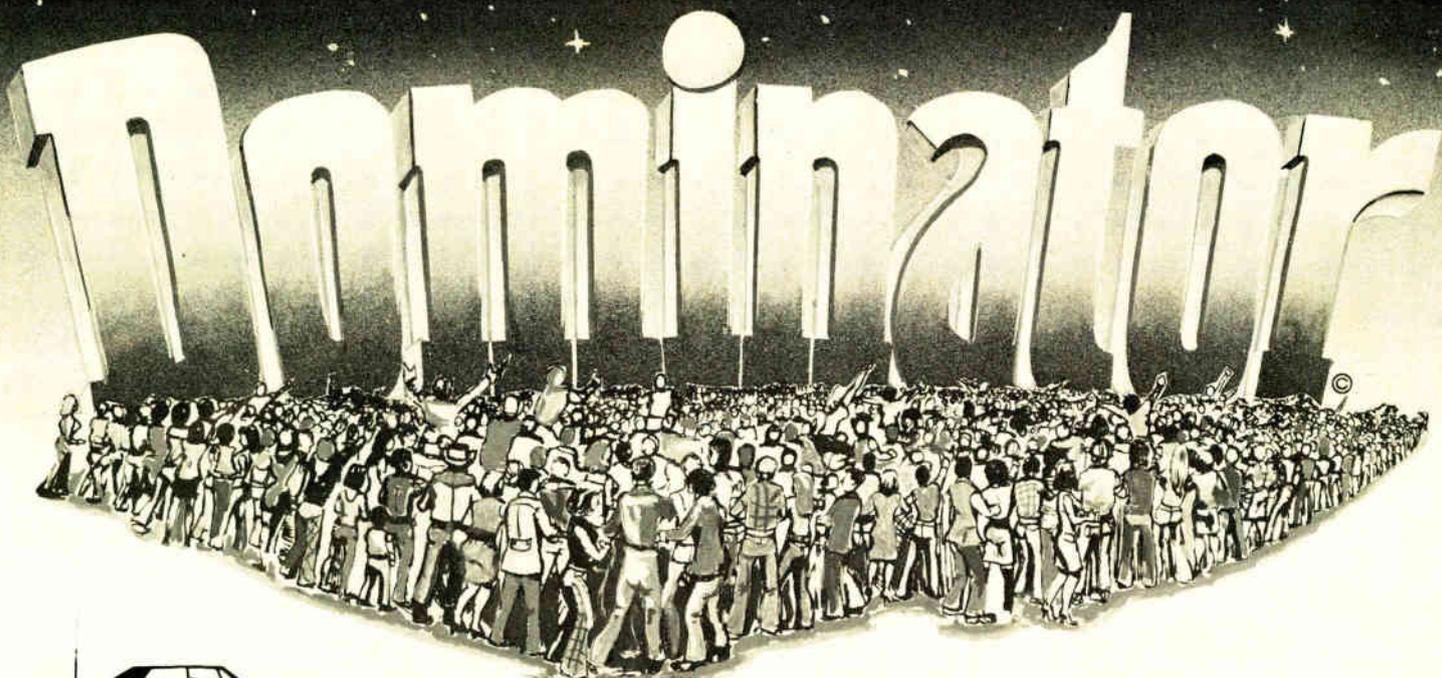
LaPorte Chapter of the American Red Cross.

He says the class takes practical, as well as actual emergency situations and discusses how best to handle them. They practice bandaging, artificial respiration, and cardio-pulmonary resuscitation.

Getz says the group hopes they never have to use these measures, but his class knows they can and will if they find themselves in an emergency situation. "The care of our friends and neighbors is utmost on our minds."

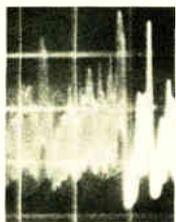
Other functions of the Community Watch besides patrolling the area and the house watch, is to provide free dances for the teens in an effort to give the young people planned activity and recreation.

Anyone who lives in Hudson Lake wishing to join Community Watch or would either like your property patrolled or you wish to call for help, call Tom Jost at 654-8534; Ron Hora at 654-3089, or Mrs. Sharon Modjeska, 654-8364. Officers include Mike Zarembka, president; Hora, vice president; Mrs. Carol Hora, secretary-treasurer.

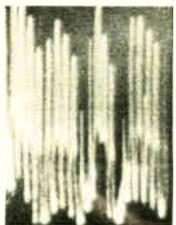


Rise above the crowd!

England's Beecham Electronics introduces the **DOMINATOR**, a hand-crafted multi-stage speech processing unit that processes the output from any standard microphone into fuller, more effective audio. Brings modulation up to 100%, puts more punch into your signal with less distortion. Up to 10 db more actual "talk power" for increased range and coverage. Similar units in military and commercial use proved effective improving signal quality; improvement sometimes comparable to a beam or linear amplifier.



Without Dominator

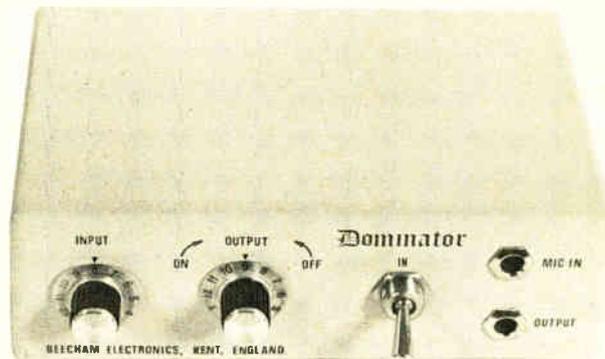


With Dominator

Not just a microphone amplifier. The **DOMINATOR** uses state-of-the-art plug-in Integrated Circuits and advanced design to raise the average talk power of any AM or SSB signal on any 23 or 40 channel rig as seen in these oscilloscope photos. Works with any transceiver. * No rig modifications. Push to talk works normally. Standard PTT adaptor plugs are supplied for easy hookup. Die cast aluminum cabinet. Use mobile or base. Battery powered (Eveready 276 9V, or equivalent). A flick of a switch puts the **DOMINATOR** in or out of the circuit.

The **DOMINATOR**. Handcrafted in England for the discriminating American CBER who wants to rise above the crowd. Available by mail order only.

* An uncommitted connector strip is built into every Dominator to handle even the most complex mike line.



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Each **DOMINATOR** is shipped postpaid via insured Air Mail directly from England by the manufacturer. This passes considerable savings on to you. There is a very small duty of 7 1/2% charged on such imports, but don't include this now. Your postman will collect it upon delivery ... it's that easy.

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CB Newswire

YOUR CB NEWSPAPER

FEBRUARY, 1977

INCLUDED IN \$9

REACT Handles "Kathleen"

Last September 10th one of those "not-too-common-to-Southern California" tropical storms struck dumping inches of rain and leaving an expensive path of destruction to Imperial and Riverside Counties. Heavy rains both in the mountains and desert culminated with large flash-flooding, particularly in the western section of Imperial County. The retirement community of Ocotillo, hardest hit, suffered 2 dead and many homes damaged by the 40 mph downhill flood. Interstate 8 at the Mountain Springs Grade East-bound was literally washed away! West-bound fared no better as the Myer Wash bridge was also sent downhill closing I-8 for a week. Engineers note that it may take a year to restore both lanes of the freeway back to its original appearance.

Eighteen of the thirty-five members and sixteen volunteer auxiliary members of Drifting Sand REACT (#2917) responded to the need. An Emergency Communication Center (ECC) was established during Friday's storm at Hen-

drix Electronics (a Motorola & Johnson Dealer) in the city of Imperial; at the time one of the few places in the County with power and telephone capabilities. Full spectrum communication was utilized including CB, law enforcement FM, and HAM 2 meter (WA6BEM). Contact via CB, 2 meter and landline with Julian and Yuma REACT's and Amateur Radio Operators throughout Imperial, San Diego, Riverside Counties and Baja Mexico was maintained throughout the storm providing accurate up-to-the-minute information which was passed on channel 19 to the general public. At this time Imperial County was literally cut-off from the rest of the world on the ground. Team coordination and direction radio traffic was handled on CB Channel 7.

Friday only proved to be the start of operations for Drifting Sand REACT. Upon request of the Imperial County Sheriff's Office (ICSO), the volunteer REACT team set up an ECC at Ocotillo Volunteer Fire Department with base station on CB channels 5 and 7, ICSO

FM, FIREMARS Net, and 2 meter, handling heavy health and welfare traffic direct from the Sheriff's Office (equipped with CB and manned by the TEAM) in El Centro. Base station relay points were also established in Seeley to help cover the distance between El Centro and Ocotillo. In addition to establishing constant radio communications, and normal channel 9 monitoring, this REACT Team assisted in the clean-up, search & rescue, attempts to contact and helping the Sheriff's Deputies with night patrol checks against looting in Ocotillo.

Drifting Sand REACT would not have been as well equipped if it were not for the generously loaned CB equipment from Hendrix Electronics. Operations spread over a five day period culminating a total of 1380 volunteered man-hours. Effects of Kathleen may take a long time to wear off, as the County is involved in a massive administrative follow-up. One thing is certain; Drifting Sand REACT will be prepared to meet the need in time of disaster.

'Preacher Man' Chases Down Suspect

A CB radio thief in Dania, Fla., didn't have a prayer when he ran afoul of both the law and, as they say, a Higher Power.

Police said a young man entered the parking lot of Dania Heights Baptist Church at 11:30 a.m. and removed a citizens band radio from a rental car being used by the pastor.

The Rev. Arthur B. Van Arsdale, known as "The Preacher Man" to South Broward CBers, was watching the theft from the window of his church office. He scribbled down the suspect's license number and handed it to his secretary. "Call the police," he said.

Most citizens would have laid low and let the cops do the rest, but the Rev. Mr. Van Arsdale had other ideas.

The minister, who stands 5 feet 9 inches and weighs in at a whopping 150 pounds, dashed outside, hopped in his car and pursued the culprit.

Dania policeman Larry Leiman, patrolling the area, saw the two cars

speed by and instantly recognized the fellow in the second car as the chaplain for the Dania police force.

Leiman wheeled his car around and followed the preacher, who was gaining fast on the getaway car.

"I pulled up next to him and showed him my badge, but he still didn't pull over," said the Rev. Mr. Van Arsdale, who holds a captain's rank in the department. "Next time I made it more definite. I curbed his car and blocked it in so he couldn't get away. He nosed into a concrete wall."

The suspect emerged from his car and asked the reverend, "Am I in trouble?"

Seconds later, Leiman arrived at the scene. Arrested and charged with grand theft, burglary and driving with a suspended license was David Ellis, 19.

"I'm not a certified police officer, but I ride with them all the time," the Rev. Mr. Van Arsdale said. "I spent 12 years in television news so I was around cops

all the time. I knew what was going on.

"My first thought was to go after him," the 42-year-old clergyman said. "We have too much crime and not enough citizen involvement."

The Rev. Mr. Van Arsdale became one of Florida's first police chaplains three years ago, and since then he and the Dania police have traded occupational know-how. Many Dania police officers now worship at his church and, in turn, he spends a lot of road time in patrol cars.

The cleric has been in on all kinds of police action, from routine traffic stops to drug busts. That's where he learned how to nudge another automobile off the road.

But as vocations go, the Rev. Mr. Van Arsdale still prefers the pulpit to the patrol car, the Bible to the badge.

"I know better than to get in the way," he said. "My boss takes care of me, but I don't want Him to work too hard."

Telex CB power mikes deliver control tower performance on all 40 channels.

The power mike you hold

The power mike you wear.

CB-73

Handy Double-Header feature allows use as a conventional power mike or a superior, noise-cancelling power mike.

Built-in variable gain amplifier.

Front mount ends mike fumbling. Mike comes off bracket in talk position. Rear mount also included.

Long-life coil cord.



Fits every hand. The style used by pilots around the world.

CB-88

Includes eyeglass clip for use without head band.

Noise-cancelling variable gain power mike.



Boom adjusts for precise mike position, pivots for left or right use.

Telex CB-1200 Headset

Experienced CBER's can tell the difference. Telex CB power mikes give you the talkpower and range to make the most of your rig...without over-modulated distortion. And, they deliver the reliability and performance that has made Telex the quality standard in aviation communications.

Take the CB-73 Double-Header power mike, it actually "processes" voice signals for maximum clarity. The noise-cancelling mode brings you through crisp and clear by blanking out surrounding noise.

Or consider the aviation-type Telex CB-88 power mike headset: So light, you'll almost forget you have it

on. It puts the receiver sound right into your ear and assures that your power mike is in the proper transmit position. Others around you can relax, sleep or visit while you listen in private.

If you're operating in noisy areas, check out the Telex CB-1200 headset. It really blocks out highway and vehicle noise.

Whatever your CB use...cars, vans, RVs or long-haul rigs...if you're serious about CB, consider upgrading to Telex. You'll come through loud and clear.

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CB Newswire

YOUR CB NEWSPAPER

FEBRUARY, 1977

INCLUDED IN S9

Nevada Proclaims REACT Week

Governor Michael O'Callaghan signs proclamation declaring the first week in November as REACT week. REACT stands for Radio Emergency Associated Citizens Team. It is a voluntary organization that monitors Channel 9, the emergency channel on the Citizens Band network. Channel 9 is used for emergency communications involving the immediate safety of life or protection of property or for communications necessary to render assistance to a motorist. REACT acts as a relay in an emergency to either the Police Department of the Fire Department.



Clark County REACT, which is one of the oldest REACT units in the state and has been serving the community for over eight years, will have a booth at the Jaycee State Fair being held at the Convention Center November 3 through November 7, 1976.

Everyone is welcome to stop by the Clark County REACT Booth #233.

At the signing of the proclamation left to right representing Clark County REACT are: Claude Patterson (Vice President) Unit-41, Warner Heath—Unit-21, Ken Patterson (President) Unit-11, Jean Gregory—Unit-62, Governor O'Callaghan, Tina Chapman—Unit-30, Bob Phipps Chairman of the Las Vegas Jaycee State Fair, and Jeff Leavitt—Unit-18.

Tributes To Tenn. Swamp Rat

"The Swamp Rat has signed off. But the channels he opened into the hearts and minds of the people of Bradley County will continue to convey his hope and aspirations for years to come."

The Cleveland Daily Banner marked the death of 10-year-old Jimmy Scoggins with that statement.

Jimmy, whose handle was the Swamp Rat, chatted with the truckers on Interstate-75 on the CB radio which a sympathetic community gave him. He was a healthy, happy boy until last spring when doctors at St. Jude Children's Hospital in Memphis found a malignant tumor near his brain.

For months after that, his grandparents drove him to the Memphis hospital once or twice each week for treatment. Over the Labor Day weekend, two CB radio clubs hosted a coffee break for the boy and his grandparents, raising \$4,000 to help with soaring medical bills.

"Jimmy Scoggins put up a heck of a fight for a 10-year-old boy, but he lost . . . in the struggle for his earthly life," The Daily Banner said in an editorial.

"But while he lost that battle, he was victorious in the total war. . . . He won the hearts of big brawny truckers who manipulate the giants of the roadways, and he claimed the admiration of the people of Bradley County."

250 Search Florida Rockpits For Girl, 8

Nearly 250 Broward police officers and CB operators futilely scoured canals and rockpits looking for an eight-year-old Hollywood girl.

Detectives investigating the disappearance of Lisa Lynn Berry, a Miramar Elementary School student, said they have a suspect in the case, but there have been no arrests.

An unidentified man questioned by Fort Lauderdale police was reportedly seen talking to the girl in the parking lot of a Fort Lauderdale bowling alley immediately before she disappeared.

Meanwhile, nearly 250 Broward police officers and volunteers inspected miles of canal banks, rock pits and vacant lots before temporarily suspending their search at nightfall.

A green sweater and a pair of pink pants worn by the girl were found behind a supermarket in the early morning hours of the search. After the clothes were identified by the girl's mother, a police helicopter joined the search.

Within two hours, more than 50 volunteers were milling around the temporary communications center formed by campers and pickup trucks lined up.

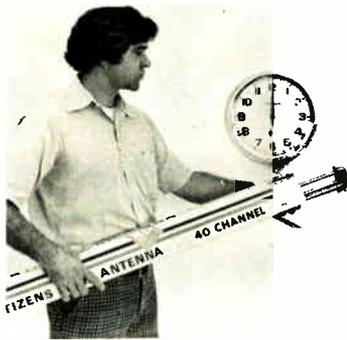
At least six witnesses told police they became suspicious of the suspect when they saw blood stains on his pant legs and also discovered blood on the passenger seat of his white van a few minutes after the little girl vanished.

Virgin Island CB Fans Avert Burglary

An alert neighbor and a group of CB fans joined forces to prevent a possible burglary attempt at Cotton Valley.

Mrs. James McGee noticed a strange van parked beneath a tree at the unoccupied home of her neighbor. When the neighbor received word from her of the suspicious vehicle, he summoned

six fellow CB'ers by radio, who arrived at the scene within minutes, some even ahead of the police. The van, however, had apparently left when the vehicles began to arrive, and left no clues at the scene except a pile of fresh chicken bones. No signs of forced entry were discovered at the home.



Slide antenna from box



Raise top radiator



Attach static wires



Tighten collar coupler, securing top radiator



Open like an umbrella....secure ground radials....fully extend bottom radials and tighten.....attach coaxial, slip onto mast and up she goes!

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When it comes to omni-directional base station antennas....specify Golden Hawk from Channel Master! The fastest assembling antenna in its class. Sixty seconds from package to completely assembled antenna.

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The Golden Hawk is an excellent performer with either 23 or 40 channel transceivers. Designed for the professional installer, made for the serious CBer.

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CB Newswire

YOUR CB NEWSPAPER

SEPTEMBER, 1976

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Long Islanders Pitch In To Help!

One day last September, a group of CB radio enthusiasts walked into 7-year-old Tommy Costa's room at Southside Hospital, with a coffee can. They emptied the can, spreading \$460 in dollar bills, quarters and nickels all over his bed. "I started crying," Tommy said yesterday. "I was ready to give it back, but they said no, it's mine, to help me get out of the hospital." Calling themselves "Tommy's Army," CBers who tune in to Channels 5, 14, and 21 have joined forces to help the Costa family, of Deer Park. A few days earlier, Tommy, his father, Joe ("Meat Ball Hero"), and his 6-year-old sister, Gina, were hurt in a head-on auto collision. Joseph Costa and Gina were not seriously injured, but Tommy's hip, shoulder and nose were broken. He was taken to Southside Hospital with the assistance of two CBers who were pass-

ing by, and the CBers have been helping ever since. Last weekend, the CBers served free coffee and doughnuts at Long Island Expressway Exit 51 to anyone who would make a contribution to Tommy's cause. They collected \$460, and they plan to do the same every weekend until Tommy is out of the hospital, according to "Shepherd," one of the CBers. Doctors say Tommy will be able to go home in a body cast in six weeks, and he will be out of school for a year. A CB base station, also provided by his buddies, will help the time pass more quickly. In addition to hospital fees, it is costing the Costa's \$106 a day for a private nurse.

Tommy's handle is "Doctor Little," local CBers can give him a shout on Channel 5. For further info contact Roy Tangen, 3 Montauk Dr., Bay Shore, N.Y. 11706.

CBers' Patrol

Aids N.J. Police

After finishing his work as a jeweler, George DeSanto hurries home several nights a week so he won't be late for patrol.

DeSanto is one of a group of volunteers who patrol the streets of Ridgefield four hours a night. The volunteers—each owns a car with a citizens band radio—report any unusual occurrences over their radios to a base station in police headquarters manned by another volunteer.

Ridgefield doesn't have a severe crime problem, but Acting Police Chief George Corvelli says he thinks the volunteers can be of great service.

The patrol is the idea of Councilman Gregory Hansen. Hansen says that the civilians aren't meant to replace police, but are to report anything suspicious so police can take over.

"Besides giving the community extra protection, I am also giving my wife and two boys more protection," said Frank Ganci, parks superintendent for the borough.

A patrol volunteer who works in administration at Englewood Hospital, Frank Fieder was a special police officer at one time. He thinks he can do an even greater service in the patrol.

Hansen pointed out that summonses for motor vehicle violations jumped from 150 to 300 between July and August, because the regular police were not tied up with routine patrols.

The volunteers get 15 cents a mile from the borough for expenses, but no other compensation. There are 12 in the group now; Hansen hopes to capitalize on the current CB radio craze and increase the group to 20.

Volunteers have to be at least 18 years old, have a CB radio in their car, and be able to donate 10 hours a month.

Hansen has plans to encourage similar units in adjoining towns.

Hansen's next proposal will be establishment of a volunteer block watcher program. The program would involve a pedestrian patrol with volunteers making their reports over hand radios.

Illinois "Smokies" plan all-out CB plan

by Jim Delaney, KJS9081

The State of Illinois has submitted specifications, open to CB manufacturers, detailing exact wants for base and mobile CBs to be installed in all State Police vehicles and base police headquarters throughout the state.

Part of the specifications call for the units to be of the "scanner" type to constantly monitor channels 9, 10 and 19.

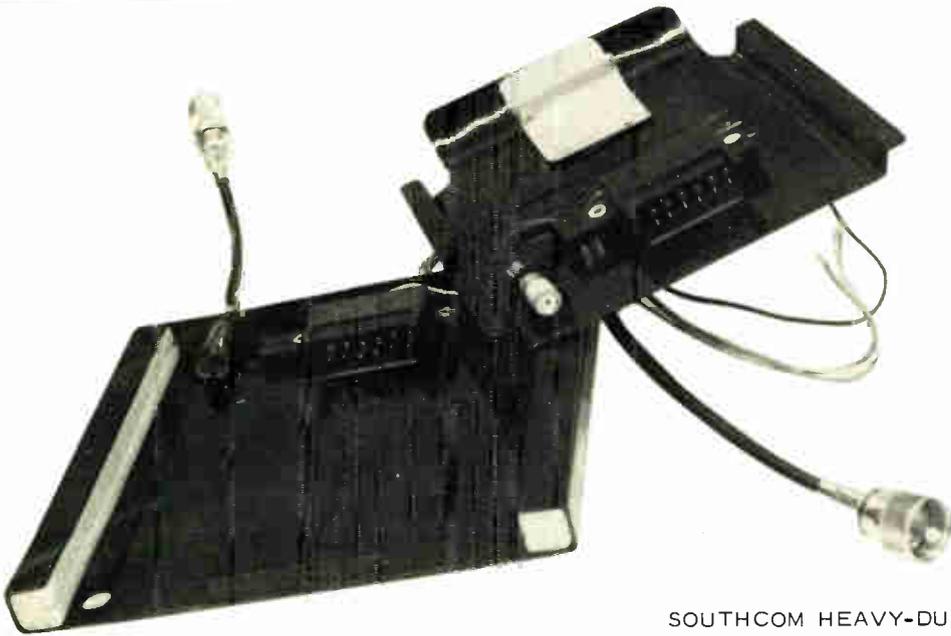
Official sources indicate that the State Police will be instructed to answer all "breaks" from CBers when an accident, emergency or call for assistance is broadcast. The officer will then relay the message to his district headquarters, who will, in turn, issue orders or the procedure to follow.

It was also learned that the State will not harass or warn CBers who give "smokie" reports en route. "One State Police vehicle on a major thoroughfare seems to invite a load of bear reports by CBers" a Police district commander stated, "and as a result, traffic slows down for five miles in each direction, and with all the radio reports one

hears, it sounds as though there's a dozen squad cars in the area instead of only one." He added: "It pleases us very much."

The FCC call letters that have been requested by the State of Illinois, to replace their present call letters, are KIL 0911. The number, patterned after and including the new 911 emergency telephone number used in many areas, will be easier to remember for Illinois as well as other states intending to follow the numbering system. The two letters of the alphabet following "K" will indicate the state issued the call letters. Example: KIL (Illinois), KMO (Missouri), KWI (Wisconsin), KIA (Iowa), etc. The 0911 will be standardized numbers for all states in the plan.

The State of Illinois, who already has \$200,000 budgeted for the purchase and installation of CB radios to equip all State Police vehicles and base District Headquarters, will form a direct and much closer link between all CBers and police. Immediate assistance or emergency help will be only a "call" away, saving precious minutes when minutes count.



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CB Newswire

YOUR CB NEWSPAPER

FEBRUARY, 1977

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"Teddy Bear"

A truck driver is going to come barreling along Alabama 157 in south Morgan County and he'll hear on his CB radio "Breaker one-nine. This is the Real Live Teddy Bear. Can you read me? Come on."

And the trucker will probably answer, "I read you loud and clear Teddy Bear. Come on."

While that scene may sound like it's from a recent country music hit, the real live Teddy Bear is 11 year old Jonathan Blair of Hartselle.

Country singer Red Sovine, who sings "Teddy Bear," presented Jonathan with a CB radio donated by Kris, Inc. of Cedarburg, Wisconsin. He made a special trip to Jonathan's home in September.

Jonathan is paralyzed from the waist down and has been since birth because of spinal defects. He has had 15 operations and faces the most serious within the next few years.



Red Sovine found the "Real Live Teddy Bear" in Hartselle, Alabama. Red came down from Nashville to present Jonathan Blair, age 11, with a citizen band radio donated by Kris, Inc. Shown here left to right are Searcey Hall of WHOS radio in Decatur, Jonathan Blair, Paul Hayden of Kris, Inc. and Red Sovine. Jonathan was given a temporary permit by the Alabama Citizen Band Association so that he can jaw-jack legally.

Sovine in "Teddy Bear" sings about a crippled boy who makes friends with truckers on his CB radio. Jonathan's mother, Mrs. Faye Brewington, wrote Sovine telling him of the similarities between the boy in the song and her son and how much the song meant to both of them.

Sovine was so touched by Mrs. Brewington's letter, he decided to give Jonathan a Kris CB radio, which he had been wanting for a long time.

Jonathan and Sovine met early in September. Both were in wheelchairs, Jonathan, because that is the way he usually gets around, and Sovine, because of a broken leg.

Paul Hayden of Kris, Inc. and Bryan Mason of the Alabama CB Association were on hand for the presentation of the CB. Hayden assembled the Kris CB and Mason presented Jonathan with a temporary CB operating license and membership in the Alabama CB Assn. Members of the South Morgan County CB Club had already installed an antenna.

Philadelphia, Pa. CB Operators Track Down A Stolen Car

Clarence Thompson heard a real-life drama on his Citizens Band radio.

He listened as four of his CB radio buddies closed in on the man suspected of stealing his car.

As Thompson sat by his base in his home, voices crackled over his rig.

"I see him." "There he goes, he's turning the corner." "I spotted him."

After about 20 minutes of winding through the streets of North Philadelphia, "101," "Grand Dog," "Big Chief," and "Prosecutor" trapped the suspect at 27th and Dauphin Sts.

Police were right behind them. They arrested Wayne Johnson, 26, of North Philadelphia, and charged him with auto theft and receiving stolen property.

Thompson discovered his 1973 Pontiac missing when he looked outside his home at about 7 a.m. He promptly sent out "10-33!"

It was only a few minutes later when

another CB operator reported he spotted the car around Broad St.

The man, whose "handle" Thompson said he had forgotten, reported he was on his way to his "salty mine"—his job—when he spotted the car.

But, the man reported, the fugitive "had the pedal to the metal"—was speeding—and the operator lost him.

It wasn't until shortly after 5 p.m. that James Williams, whose handle is "101," came upon the stolen car at 25th St. and Sedgely Ave

He and Thompson called in Herbert Mansfield (Big Chief), Clarence Upshaw (Grand Dog), and Theodore Waugh (Prosecutor).

Ironically, Thompson knows these men only as voices. He has never met any of them.

"We all socialize on the radio," he said. "I always liked the CB, but now I wouldn't do without it."

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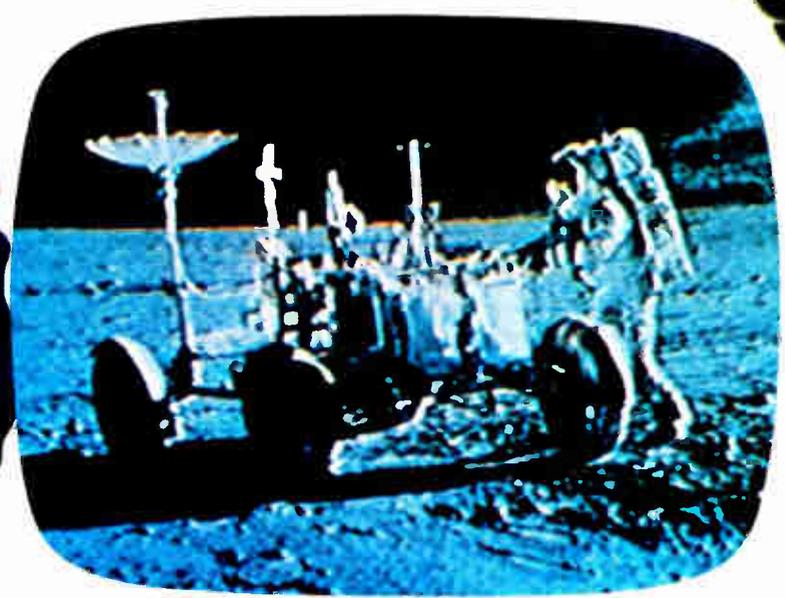
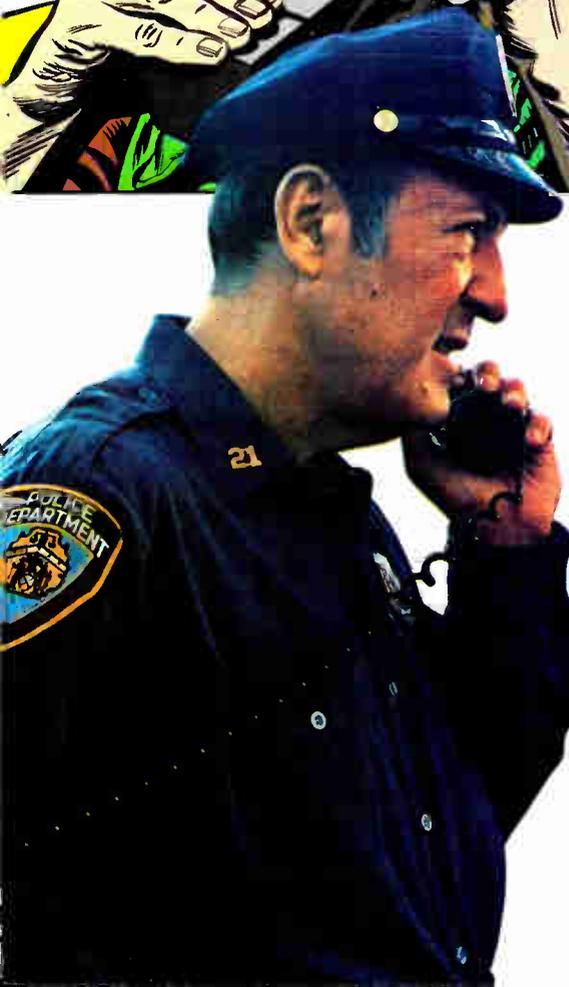
Motorola engineers create the hand-held Walkie-Talkie—the first miniaturized AM transceiver small enough to be cradled in a hand.

1950

Motorola is clearly the leader in professional communications as police, fire departments, taxis, and industry put the tool of 2-way radio to work.

1971

Motorola puts the first FM receiver on wheels on the moon.

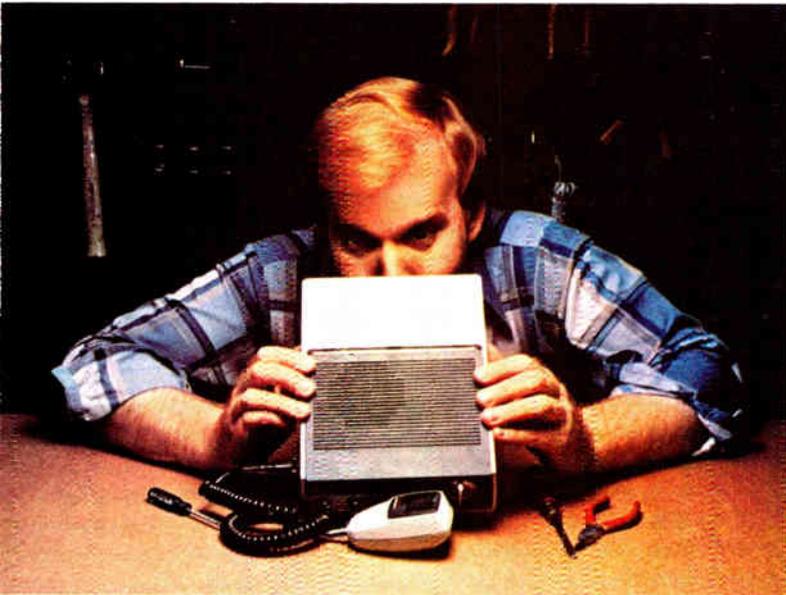


1977

Motorola introduces the 40-channel CB radio that only 40 years of experience could produce.



The Motorola Series 4000 CB radio: a look under the hood.



Don't be deceived by the simple, uncluttered styling of the Motorola CB radio.

Tucked under that hood are many built-in, fully automatic circuits that result in truly superior talk/listen performance—instead of unnecessary dials and switches.

Our microphone ❶, for instance. A built-in pre-amp makes it a power mic. But you don't need batteries. And it doesn't cost an extra 50 bucks.

What you do get is full legal modulation, at a very low level of distortion. Which means people *will* hear you, sounding like you, not some relative of Donald Duck's.

Built-in audio compression and a high level splatter filter ❷ improve audio fidelity, maximize "talk" power—while making sure all your signal stays on channel.

And a highly effective TV interference filter ❸ will help keep peace in the neighborhood should you operate as a base station (see Accessories, pg. 6).

On the listening side, the Motorola CB boasts a professional-quality 3½-inch top-fire speaker ❹. Top-fire directs the sound up at you (or rebounds it to you). Bottom-fire sends it down into the sound-absorbing carpet.

Automatic Gain Control ❺ (built-in, naturally) protects you from being "blasted" or blocked by a signal that's too strong, too close. Yet it boosts weak, distant signals.

Automatic Noise Limiting ❻ on a Motorola CB is truly automatic—limiting only when necessary and only the noise, not the signal.

Every Motorola CB utilizes a sophisticated digital phase lock loop synthesizer ❼ for on-frequency transmissions without the need for features like delta tuning.

Selected models offer an L.E.D. channel readout display ❸ that can be read at a glance.

Two models (the 4005 & 4020) give you the additional advantage of an Extender® ❹, a super-sensitive noise blander that "extends" your range in weak signal/high noise areas.

All Motorola CB models are completely solid state. All offer an external speaker jack ❿, squelch control ❾, PA switch ❻, and S/Rf meter ⓫.

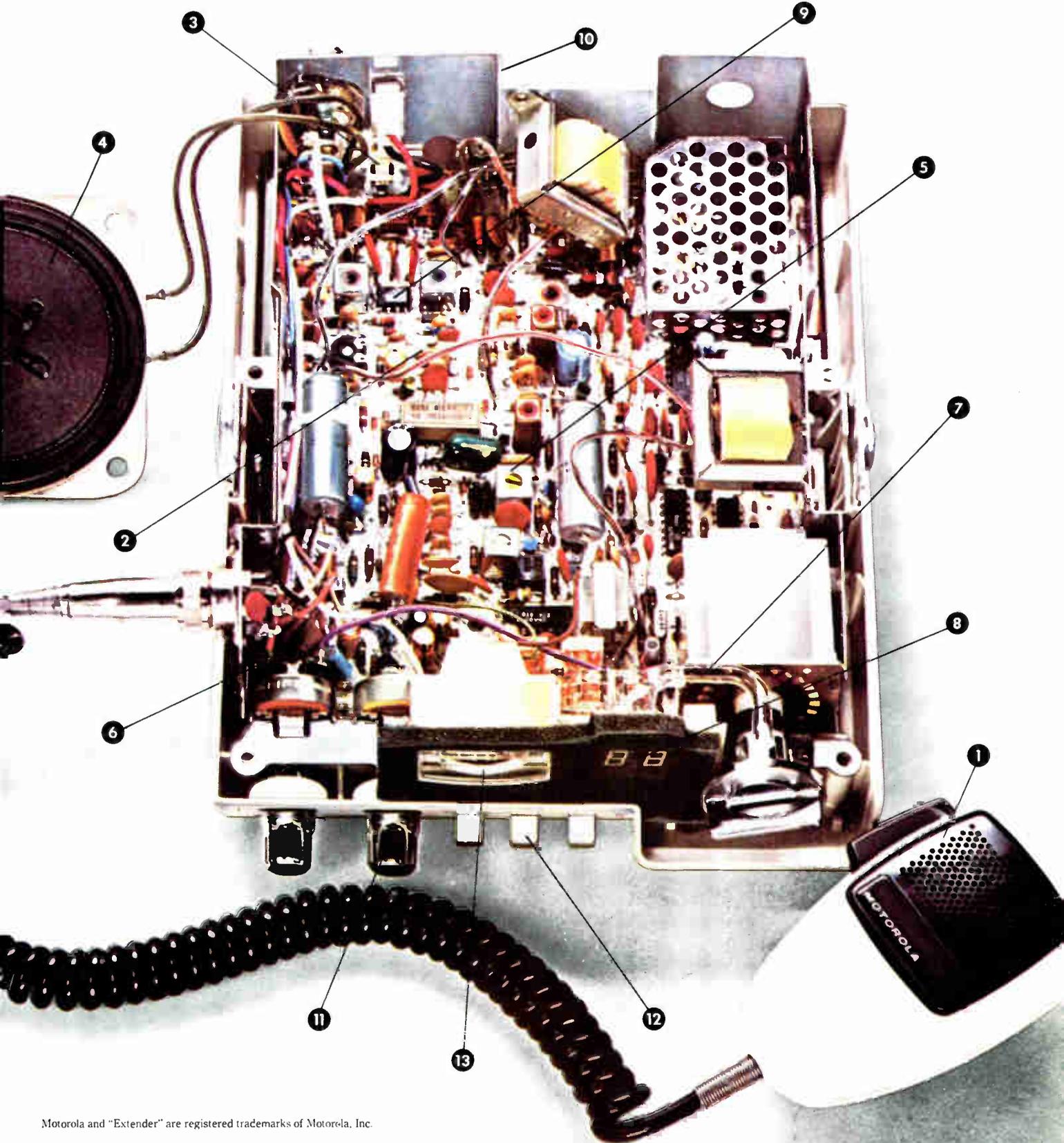
All provide burn-out protection for your radio in the event the radio is operated with a damaged antenna. Your radio is protected, too, if the set is accidentally wired back-

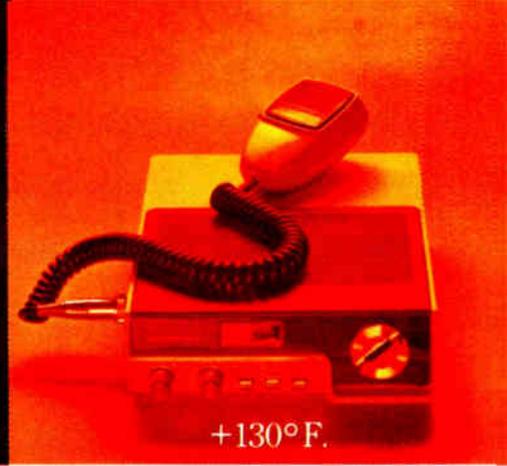
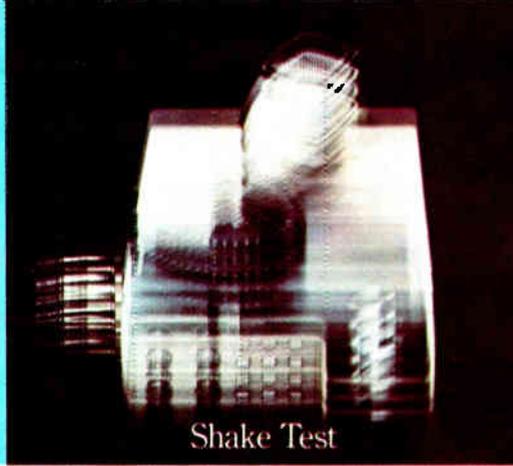


wards during installation.

But for all the state-of-the-art technology that goes into our radio, it's really performance that counts.

We believe the Motorola CB will outperform any of its competitors. Put one under your dash and you'll believe, too.





A Motorola CB isn't just tested. It survives.

Each Motorola CB is 100% tested and inspected at each step in the manufacturing process.

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This kind of attention to quality control has made Motorola 2-way radios the standard of dependability in professional communications.

So we make sure our CB radios will live up to their reputation by making them live through the same tests our professional radios survive.

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Motorola CB

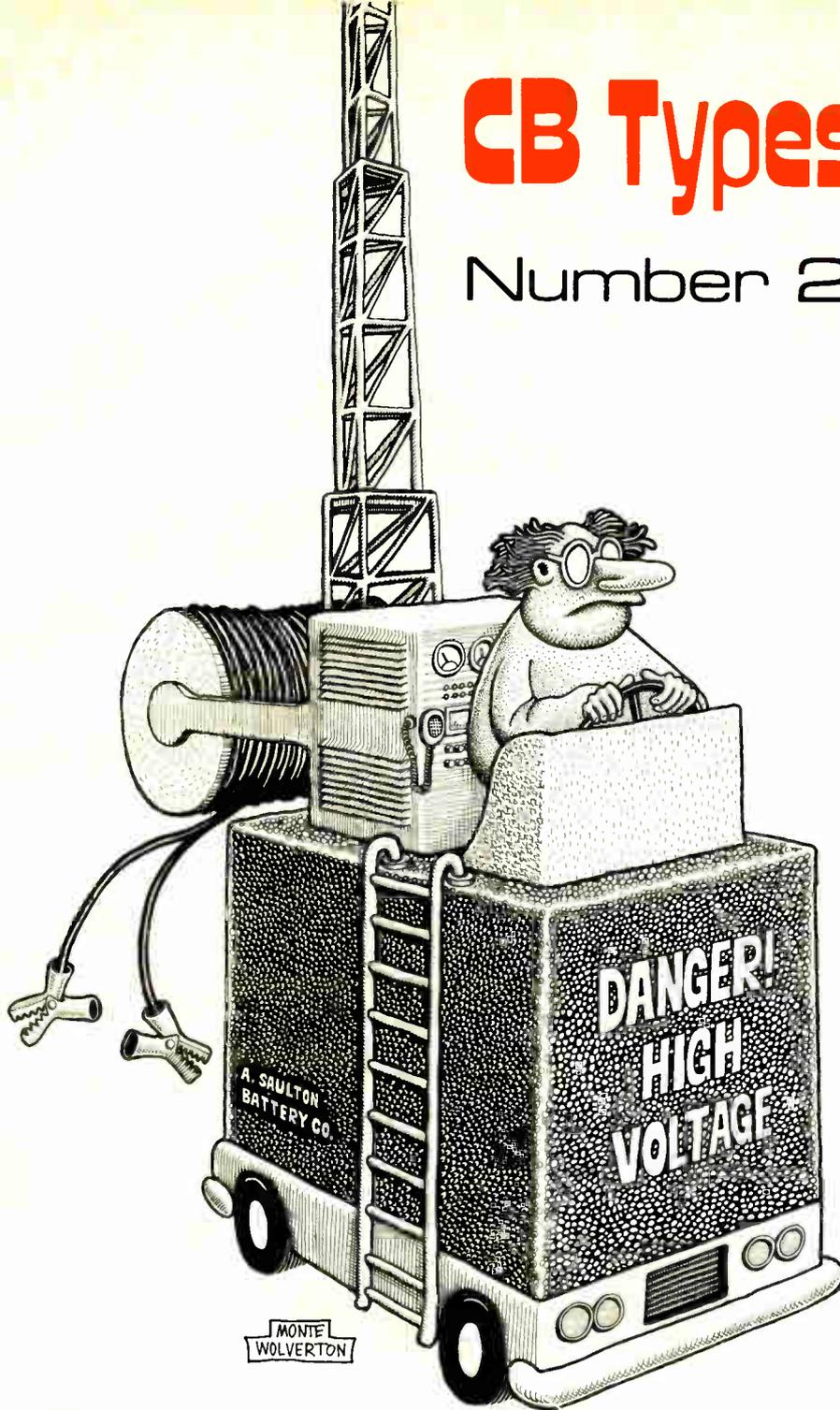
From the voice of experience in 2-way radio.

Sale or lease of Motorola 40-channel CB radios is subject to FCC type acceptance.
To find the dealer nearest you, write: Customer Relations Manager, Motorola, Inc., Automotive Products Division, 333 Northwest Ave., Northlake, Illinois 60164.



CB Types:

Number 2 of a Series

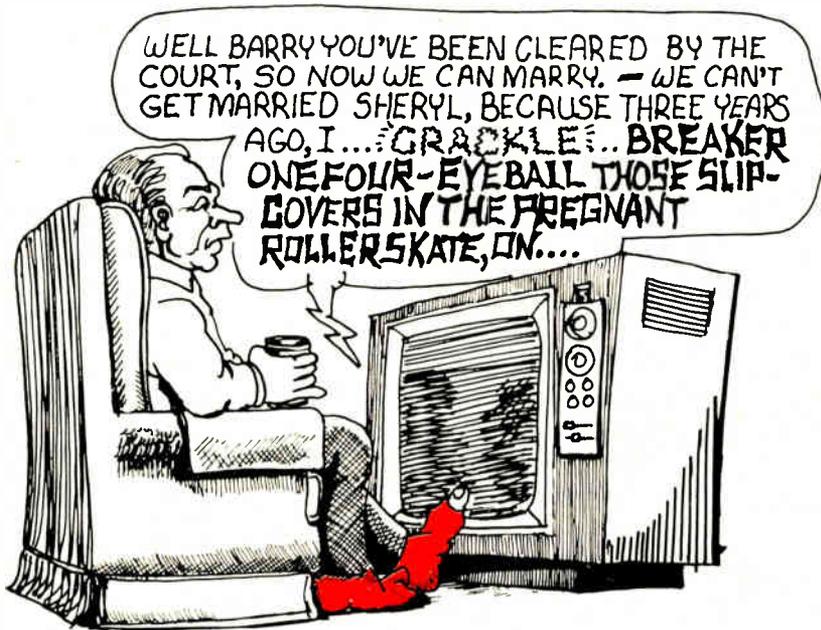


EXCESSIVE MOBILE POWER SUPPLY

This item is designed for those who can't seem, by conventional means, to obtain enough power for their drastically overpowered units. The driver sits atop a giant storage battery. The battery is recharged periodically by connecting the jumper cables (on large spool at rear of vehicle) to any nearby high voltage transmission lines. The one hundred thousand watt transmitter, housed in an enclosure behind the driver, is connected to a telescoping two hundred foot antenna. The antenna compresses to a neat six feet to pass impaired vertical clearances, and to dispell the suspicions of any FCC agents who might happen by.

TOMCAT sez: Cure those T.V. Jeebies!

By Tom Kneitel, *Tomcat*, CB Radio/S9's Editor



FOR SURE -----

T.V. INTERFERENCE

CAN BE CURED!

ARE you one of the fortunate operators who hasn't had to face the little problem of television interference, TVI—or Tennessee Valley Indians, as popularly called on the CB channels? If you haven't faced it yet, chances are you will!

All manner of stripes, flashing bars, and other light-show effects, to say nothing of actual CB voices, can make your neighbors shudder and squirm, which might not be too bad, except for the fact that they will probably also *squawk!* And what's even more horrifying is when you start experiencing this interference on (*arrghhh!!*) your own TV set!

The New York office of the FCC, for instance, receives about a thousand TVI complaints per month—a 30% increase in 18 months, a 50% increase over a few years ago.

Of course, CB has taken the rap for much of this inasmuch as CB'ers have been in the news more than any other communications service—if a person has interference on their TV set then obviously, it *must* be a CB'er! Fact of the matter is that TVI can be caused

by Ham gear, police/fire/taxi and other public safety and commercial 2-way equipment, industrial equipment, faulty home electrical wiring, fish-tank pumps, oil burners, even the TV receiver itself (or its antenna) being at fault. As a matter of fact, Henry Paulisen Chief Engineer of the FCC's New York office says that 99% of the complaints are *not* the fault of the CB transmitters involved, but of the "inadequate design of the television set."

Naturally, such statements are quickly scoffed at by TV industry people who will say no more than there is room for improvement on both sides of the problems. Also in the midst of the battle are the major TV networks who have been screaming long and loud about their programming gems being messed up by CB transmissions.

On the one side of the fence, new 40-channel CB rigs must meet extremely rigid technical specifications to eliminate any possibility of TVI being the fault of the CB'er. On the other side, a bill has been introduced in Congress to require that TV sets have built-in filters

to eliminate such interference problems—although TV manufacturers argue that there aren't enough CB'ers around the country to warrant adding the expense of a mandatory TVI filter to the cost of every TV set. Manufacturers say that in rural areas of the country, TVI might never be encountered. The FCC claims, however, that within the next few years about 70-million households will be CB-equipped. So, both sides of the problem, at the manufacturing end, will have to tow the mark. Unfortunately, when your neighbor comes pounding on your door you'll find it difficult to present such an objective look at the situation—it is *you* that is causing the problem. That is to say, had you become interested in tennis instead of CB'ing, your neighbor wouldn't have the problem!

So, if there is a TVI problem and you have an irate neighbor standing on your front stoop, some sort of action will undoubtedly have to be taken—and, maybe, after all it will have to be handled at *your* level at the outset. So let's see some of the factors involved and how, why, and *if*, you, as an individual CB licensee should take any action.

ITS CAUSES

A CB rig is a device intended and federally authorized and licensed to emit a radio signal between the frequencies 26.965 MHz and 27.405 MHz, while a TV receiver is designed to pick up signals starting at 54 MHz and running up into the hundreds of MHz—the frequency of TV Channel 13 is 210 to 216 MHz. It is unlicensed. So what's the problem, and why should these two devices not be easily compatible, after all, you don't get interference from TV stations on your CB rig!

From the CB side of the problem, we have to remember that there are presently 3 primary types of ways or methods of generating that ever livin' 27 MHz signal. The "old" plug-in crystal method, the synthesized crystal method, and the recently incorporated Phase Lock Loop (PLL) system. Each of these systems (in a very oversimplified capsule explanation—but this isn't a lecture on oscillator circuits) is used to generate the 27 MHz signal which is fed into the final amplifier of the transmitter. The plug-in type transmitter may start out with a 9 MHz crystal, and multiplier circuits in the oscillator produce harmonics from this crystal to obtain the necessary 27 MHz ($9 \times 3 = 27$). But these circuits may also generate many unwanted harmonics at other multiples of 9—they could be emitting little bits of RF energy at 36, 45, 54 MHz and elsewhere right on up the line—with each succeeding multiple usually a little weaker than the last. In addition, the fundamental 27 MHz of a CB rig may also be splitting into harmonic multiples of itself and producing "signals" at 54, 81, 108, 135 MHz, etc.

Yes, these harmonics are not as strong as a 4 watt CB signal, but they are comprised of RF energy—and, of course, if you happen to be pushing a lot of juice out

through a linear amp, if your rig is tossing out harmonics, some of them could be pretty healthy.

Supposing that you were operating on CB Channel 11 (27.085 MHz) and your rig was generating harmonics. Your second harmonic would be on 54.170 MHz and your third harmonic would end up on 81.255 MHz. These signals just happen to coincide with TV Channels 2 and 5. Actually, second harmonics from CB rigs can appear anywhere from 53.930 MHz right on through 54.810 MHz and can affect TV Channel 2. Third Harmonics could show up between 71.255 MHz and 82.215 MHz and could end up doing a job on TV Channel 5 (possibly also slightly jamming TV Channels 4 and 6, depending on the CB transmitting frequency). In addition to possibly wrecking some TV reception and running the risk of having the FCC say that you are operating off frequency, if your rig is generating harmonics, it's piddling away some of the potential and wanted 27 MHz power of your rig.

In addition to harmonics of the primary 27 MHz frequency, rigs with synthesized and PLL circuits can also generate a myriad of odd and unusual unwanted frequencies if they aren't operating properly—PLL rigs, especially, have the potential of sending out the weirdest damned frequencies if something is out of kilter. Of course, if operating properly they don't have any of these problems.

Harmonics are the only form of TVI which can be cured at the transmitter, and their riddance will be discussed shortly.

Meanwhile, back at the TV set, a common cause of TVI is due to so-called *front-end overload*. This is especially noticed in areas of fringe TV coverage and is caused by your 27 MHz signal (and this has nothing to do with harmonics) just overpowering the TV set's circuits and its ability to reject unwanted signals on



"The only TV sets I jam now are all installed in Rolls Royces!"

frequencies other than the TV channels. Yes, even though a distant TV station may be tossing out an effective radiated power of several hundred thousand watts, your next-door CB rig could well *appear* to the poor TV set to be the signal it really wants to receive—and it will promptly accept the CB signal and run it through on all TV channels. I mean, what the hell does a stupid TV receiver know about the difference between your CB signal and *Hogan's Heroes* reruns?

So the TV receiver can get wiped out by unwanted frequencies being generated by your CB rig, or it can be done in by its own inefficiency—in most cases it's the fault of the TV receiver, possibly made worse by the desired TV signals made even weaker in their battle with your signal for the attention of the TV set by old and cracked antenna lead-in wire, or an old and corroding TV antenna.



"Look Manny, I'll stay off during Hee Haw if you stay off during Walter Cronkite."

LET'S THINK OUT THE PROBLEM

The feeling generated by the TV viewer is, of course, that TVI didn't exist before you got your CB rig, so obviously you are causing the problem. Regardless of whose fault it is, you, and *only you* are the enemy. They may tell you that you are "broadcasting on a TV channel," or that they are going to call the police. They may also threaten you with a knuckle sandwich in the teeth. Obviously, *some* action and investigation is called for.

Understand that the police don't normally have any jurisdiction over your CB rig. The police can't come to your house and put you off the air—this is the realm of the FCC.

The TV viewer, it should also be realized, isn't very technically inclined, doesn't give a hoot about harmonics, front-end overload, and the like. All he knows

is that you are lousing up his reception. Attempting to lay a whole technical explanation trip on him is only going to make him think you are giving him a razzle-dazzle. But, if it *is* your fault, maybe you should be happy that it was brought to your attention so that you can get to the cause of the matter and correct it.

You should first determine that it is a CB signal causing the TVI, and *your* signal in particular. How does he know it was you on the TV set—did he hear your name, handle, callsign, or what? Or, did he just assume it was because he saw your CB antenna on the roof. Could be caused by any number of other sources or other CB'ers in the area. Let him show you the interference.

You might explain that while it is *possible* that your signal could be coming through on his TV set, that your station is licensed by the federal government and that the equipment was FCC accepted to meet rigid technical standards, while his TV receiver is *not* licensed and has not had to pass a federal inspection for design and production quality.

So, let him show you the TVI—go over to his house, let someone modulate into your CB rig while you watch his TV set. Is it really your set coming through? If he's getting the TVI while your rig *isn't* transmitting then that should end your interest in the matter. If it is your CB rig, check out the TV channels which are being jammed—try all of the VHF TV channels (2 through 13). If your signals are being received only on TV channel 2 and 5, then your rig is generating harmonics. If the TVI is on all VHF TV channels, then the TV Installation is at fault—however your own CB rig could still



"Dear Sir: You are cited for violating FCC regulations by causing TV interference.
P.S. Congratulations, by interfering with a TV set 2731 miles from you, you've set a new world's record!"

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be generating harmonics. Best way to double check this is to see what happens an another area TV receiver—or your own TV set while you are modulating. If your own TV set is “clean” then there isn’t much the other fellow has to complain about.

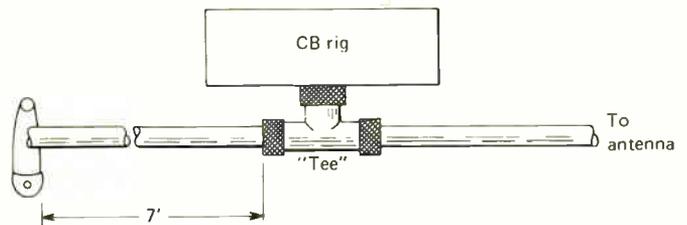
Two things are worth noting—TV sets hooked to a cable system (CATV) are less prone to TVI than sets in fringe areas hooked to their own individual antennas. However, cable systems have also been jammed by some CB transmissions taking place in the immediate area of the cable system receiving antenna. Also, single sideband transmissions, while still capable of causing TVI, are difficult to identify by the TV viewer since the modulation is garbled.

So, if you are appearing on all TV channels, then (regardless of any harmonic problems your on CB rig may have), the fellow’s TV installation is out of whack and that is *his* problem and *NOT* yours! You are not expected or required to get his TV set operating properly. You are, however, expected to take any action necessary to keep your CB “clean.”

Sometimes, by the way, neighbors don’t even bother bringing a case of TVI to the attention of an area CB’er whom they suspect of causing TVI, they simply write to the FCC and give the CB’ers callsign. In return, the CB’er will probably be contacted directly by the FCC about the matter. Since many CB’ers don’t use their callsigns over the air, it can become next to impossible to track down the source (according to one FCC spokesman).

CURES

Presuming that your CB rig is generating harmonics, the method of attempting to correct the matter is by filtering the harmonics before they get sent out of the CB rig and into the antenna to cause any problems. The prescribed method is by the addition of a *low-pass filter* to the antenna output connection on your CB rig. This gadget is called a *low-pass filter* because it will pass through only signals which are lower than a predetermined cut-off point, say, for example, 30 MHz or 40 MHz. Everything above that is attenuated, or severely reduced, if not eliminated completely. Any filter which slices off outgoing signals above 50 MHz is suitable, and there are a number of commercially made low-pass filters which can easily be obtained at



A wavetrapp such as this one will attenuate even numbered harmonics from your rig.

low to moderate cost from any CB equipment supplier. They simply connect between the antenna lead and the socket at the rear of the CB rig—installation takes seconds and requires no tools. Many operators put one of these on their CB gear as a matter of normal operation even without any TVI complaints—probably a good idea.

Here’s a hint, after some experimentation, some CB’ers have found that low-pass filters give considerably improved service if the chassis of the filter is connected to a good ground (like a cold water pipe) by a short length of heavy gauge insulated wire.

Low pass filters are rated by their cutoff frequency, amount of attenuation above the cutoff frequency (rated in DB’s), and power handling ability.

Another clean-up aid is a wave trap, not a replacement for a low-pass filter, but an aid to one. A wave-trap knocks out even numbered harmonics (2nd, 4th, etc.), and since the 2nd harmonic is usually the most damaging, it is something worth considering.

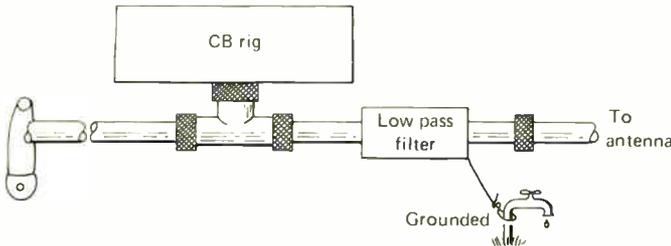
A wave trap is easily built by means of a 7 foot length of RG-58/U coaxial cable and two connectors. As shown in the diagram, place a “Tee” connector at the antenna socket on the rear of the CB rig. To one side of the connector, attach the coaxial cable from the CB antenna. To the other end of the “Tee,” attach the 7 foot length with a hefty safety pin stuck through the outer coating, the copper braid, the white inner jacket, and into the center conductor. This pin is to short the outer braid to the center conductor—and the first place it should be located is a few inches in from the “free” end. With the pin inserted, hit your mike button and say a few words into the mike on your most used channel. Get a TVI report. Turn off the rig and then change the position of the pin ¼ of an inch along the cable towards the connector, and then repeat your test. Keep



“Well, Mr. Phantom TV Jammer, are you satisfied NOW?”

repeating until you find the exact spot where TV Channel 2 interference is reduced to its minimum point, or drops out totally—this should be when the pin is about a foot from the free end of the cable. Then snap the pin closed, or cut off the end of the coaxial cable in back of the pin and solder a short between the center conductor and the outer braid.

You'll probably want to use the wave trap *and* the low-pass filter for maximum protection, as shown in the diagram.



Method of using a low pass filter in conjunction with a wave trap for maximum harmonic reduction.

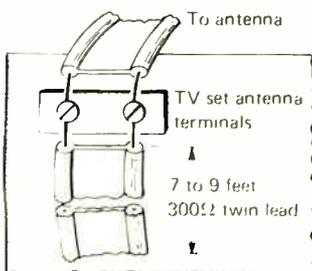
You might also wish to place a filter in your power line to trap any RF which might be sneaking back into the electrical system of your home and causing interference. Look in Radio Shack or Lafayette catalogs for these.

RECEIVER CURES

Front end overloading can be worked on at the receiver's end of the problem; however nothing done to a TV receiver will eliminate harmonic TVI, although you might try to eliminate or reduce it by means of the TV set's fine tuning control.

A wave trap can be made for the receiver, as shown in the diagram. A 9 foot length of 300-ohm TV twin lead is connected in parallel with the TV set's antenna, and there is NO need to short out the far end as in the wave trap used at the CB rig. Turn on the TV set and start your CB rig transmitting—start trimming off the free end of the 300-ohm line at about an inch at a snip. Keep going until the TVI reaches its minimum point—as you see it taking effect, you might try cutting in 1/2 inch segments. A commercially made wave trap is offered by several suppliers.

I might point out that front end overloading can cause the TV receiver to generate a peculiar type of self-interference within its own circuits which amounts to an effect which closely resembles harmonic interference from a CB rig. A wave trap should cure this.



A wavetrap for a TV receiver. It's simple and inexpensive, often eliminating TVI.

Another method of reducing the possibility of front-end overload is by means of a *high-pass filter*. These commercially made devices will chop out all incoming signals below 40 or 50 MHz. The best place to install such a unit is at the input to the tuner, which is inside the TV set's cabinet. These filters should be grounded to the TV set chassis, and in stubborn TVI cases, two such filters may be connected in series.

It is *not* the responsibility of the CB'er to purchase these for a neighbor's TV set, and is a bad practice to start in your neighborhood, lest you have several dozen neighbors asking you to furnish them too. TV set manufacturers will generally supply these filters at no cost to owners of their sets, if the TV set owner contacts the set manufacturer. In any event, leave the installation to a qualified professional TV service technician—otherwise you will be blamed for any totally unrelated problems which the TV set owner may experience at a later date!

The TV set's antenna system, including the lead-in should also be suspected as being part of the problem. TV set owners don't realize that their antenna system may have become reduced in efficiency over the years. The antenna system may need to be replaced, possibly the 300-ohm lead-in replaced with 75-ohm coaxial cable. Perhaps a new TV antenna with high gain may be employed to strengthen the incoming TV signal. Another aid is to elevate the TV antenna to a point where it is higher than area CB antennas.

PEACE AT ANY COST

Despite all efforts, some cases of TVI seem to be unbeatable. And, the FCC has noted, that they have

(continued on page 97)



"Sure, my 1,000 watt rig causes TVI, but when they come to complain about it, I'm the perfect host"

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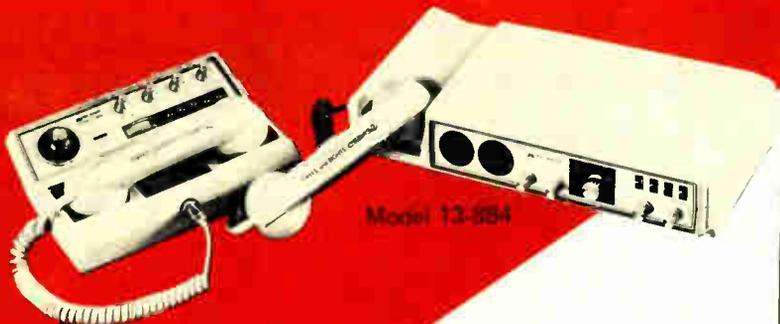
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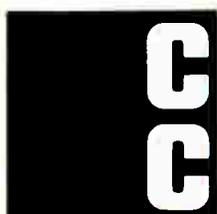
Model 13-897



Model 13-955



Model 18-279



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Tomcat says:

"Sideband Keeps-A-Rolling!"

**AS YOU EYE THAT NEW RIG—
KEEP SINGLE SIDEBAND IN MIND!**

by Tom Kneitel, TOMCAT, S9's Editor

HHEY, wait! Before you run out to buy that new 40-channel rig (or pick up a good deal on a 23!)—here are some thoughts on getting the most for your greenstamps! If you're already on single sideband, you surely know what I mean—if you aren't yet on single sideband (SSB), you are missing a good bet, and now is probably the time to get that SSB rig even if you don't figure to take advantage of the SSB capabilities of the set right away, because practically all SSB sets are also regular AM rigs too!



WHY SSB?

For the uninitiated, let me fill you in on SSB and why you'll probably want to get in on this. Basically, SSB is a rather different world than anything you might have gotten used to on the AM channels. And I mean on a number of different levels!

You may have heard SSB transmissions, even on your AM rig. They're the ones on Channels 16 or 18 that sound like *Donald Duck* quack-quacking away, except that you can't understand what these stations are saying if you're listening in on an AM rig! But they're saying plenty, and if you are one of those operators who are getting fed up to *here* with the conditions on the regular AM channels, then perhaps you'd be very interested in what they're saying.

Sidebanders are a totally separate segment of the CB subculture; some SSB operators don't even consider (or call) themselves "CB'ers," using instead the term "11 Meter Sideband Operator" to classify themselves. Yes, it's *that* different from AM!

SSB conversations range over a wide variety of topics, technical stuff, cars, sports, fishing, boating, operating practices, club activities—and very often you can get hooked into a round-table discussion or network gab-fest in which there may be a large number of stations tossing in their few cents' worth. It's a casual style of communications, a great many of the operators know each other personally—there is a totally different aura to all of this as opposed to the sometimes frantic quickie-type of communications one encounters on AM channels. Great effort is exerted by Sidebanders to practice courtesy and consideration—an operator who is rude or inconsiderate is promptly corrected by another Sidebander—and one who persists at the practice will eventually be given a rather obvious cold shoulder and (hopefully) will wander back to the activity on the AM channels where there is more of an emphasis on getting a quickie message through with little concern for courtesy, and infrequent opportunities for sitting down and really having a *conversation* with another operator.

A lot of the other trappings of AM are missing too—no *handles*, no Smokey reports, no 10-Codes, no "Gimmie A Radio Check" transmissions, and anybody asking for a 10-36 would bring instant nausea to all within earshot. Sidebanders have, in fact, developed their own operating practices and techniques which are totally different than those used by AM stations. One thing, for instance, is their use of Q-Signals, which are more appropriate for the purposes of 2-way communications than are the 10-Codes. These operating "rules" are used and respected by all operators.

You like so far? Well, there's more!

The communications range of SSB transmissions far surpasses that of stations engaged in AM communications—it is NOT uncommon for base stations to regularly communicate 50 to 75 miles with ease! Mobiles expect to talk to each other at least 25 miles. And there's less ambient noise too!



More and more CB installations are now tuned into the sideband channels—it's probably where all CB operations will be eventually. Get in on the ground floor now!

All of this sounds fantastic? Well, it's true—and nevertheless the channels are still less crowded than AM, but, of course the equipment costs more—and, also, Sidebanding just isn't as well known by the general public, even though *no* special FCC license is required for any CB'er to operate on SSB. The regular CB license authorizes AM and SSB operation, although a great many Sidebanders operate totally on SSB, having almost totally abandoned AM operations except for in-transit operations, such as Channel 19, or emergency Channel 9.

IDENTIFICATION

I mentioned that Sidebanders don't use AM-type *handles*. What they do use are special ID numbers, actually they are combinations of letters and numbers. This is the way of life on the sideband channels, and new operators are often quite surprised to find this out—having little chance of making a contact on sideband when identifying with their AM *handles*.

In some areas it is possible to obtain a set of *local* numbers from an area operator who will assign them right over the air, of course, some newcomers have complained that this has been a problem at times since they don't have sideband ID numbers to begin with, they have difficulty in getting local operators to reply to their calls for information on obtaining sideband ID numbers! As I've said, without ID numbers you're a non-person on these channels! Many operators have complained that in some areas you can't get on-the-air assignments, and, instead, must appear personally at a club meeting and bring with you several sponsors who are members of the local sideband club or group which happens to be assigning some of the numbers!

Over the years, operators seem to acquire several sets of sideband ID numbers, and their use might depend upon the numbers being used by the station to whom they are speaking. So if there are several clubs or groups in a given area assigning numbers, a great

many of the operators might well have numbers from each. In my own operations on sideband, I have local numbers such as KW-146, CL1-73, AR-1758, LIS-936, and a few others. I also use the ID of SSB-13, which are *national* (as opposed to *local*) numbers from the *SSB Network*, which is the largest and oldest group of sideband operators operating in the U.S. and Canada—these national numbers are recognized anywhere in the U.S. or Canada, and may also be used for local communications too. In a sense, they are more versatile than local ID numbers, since local numbers when used in areas where they might be unknown to the operators thereabouts oftentimes created some confusion.

In some areas it is possible to obtain national sideband ID numbers from the *SSB Network* over the air from regional operators who have been allocated blocks of numbers from the *SSB Network* for this purpose, however it is also possible to obtain assignment of your own national sideband numbers by mail right from the *SSB Network* itself.

SSB Network ID's are available by mail from The Sidebanders' Service Bureau, P.O. Box 70-H, Smithtown, NY 11787. Our suggestion is to obtain their popular Sidebanders' "goodie kit," which includes assignment of your national "SSB" sideband ID number (say that *Tomcat* sent you and they'll assign you a number from a lower—and therefore higher prestige—numbering block than is normally assigned), along with an *SSB Network* membership card (bearing your name, ID number, membership date), plus a handy conversion chart of the most popular AM codes and terms into sideband lingo, plus a really worthwhile and useful description of the so-called "rules" of operating

Here's Diana, SSB-16, at the mike. The Tram D-201 is one of the more spectacular pieces of gear to be found on the sideband channels.



A mobile sideband rig costs less than a base station. By adding a 110 volt power supply, a mobile rig can become an instant base station, and you can still toss it into the mobile unit.

on the sideband channels with a minimum of horror so that you can come across like "one of the gang" almost immediately. This also discusses the Q-Codes you hear on sideband, their meanings and uses. It's the kind of information that many old-timers on sideband could use a refresher course in, as well as the novice! This goodie kit is only \$3, postpaid. If you order the goodie kit, you can (optionally) order a gold/black *SSB Network* wall certificate bearing your name and ID number at \$2 additional. And for an additional \$2 you can also obtain 2 really sharp looking sidebander's decals—these are large (3½") 3-color water transfer decals that are quite beautiful. They've also got about 100 different operators' awards which they'll tell you about. There are no dues to belong to the *SSB Network*, ID numbers are assigned to you permanently.

WHERE IS SIDEBAND GOING

Sideband has been a rapidly growing fraternity—it offers so many good things that it's difficult *not* to like it. Almost all CB manufacturers are producing SSB equipment these days, and sidebanders are ready to set up shop on 5 of the new channels (actually Channels 36 through 40) in addition to the several existing channels which they normally use on the bottom half of the band. So it's a part of CB which seems to be the hope of the future, since sideband operation (from a strictly technical point of view) offers the chance to *comfortably* handle more stations per channel than AM.

TO BUY OR NOT TO BUY?

Now maybe you're of the mind that sideband is really something out-of-sight, and that you will probably get into it at some time in the future—maybe you're chomping at the bit to get into sideband right now!

If you're ready to roll on sideband, you've got a big selection of gear available from all of the fine manufacturers of CB gear—they're all represented.



BUT—if you like what sideband has to offer but still figure you're not ready at this instant to move in on it, let me suggest that you nevertheless get a sideband rig, even if you expect to pick up one of the new 40-channel jobs. Why? Well, just as single sideband offers more distance and clarity, making your next rig a sidebander offers you more distance on your greenstamps!

Let's say that you're figuring that *someday* you'll be getting into sideband, but not right now. Why not get a sideband rig right now? Yes they cost more than an AM-only rig, even though they can function on AM as well as single sideband—but you can switch over to single sideband at any time you like.

You might wish to do this because, as single sideband rapidly grows in popularity, you may find that some of your buddies are switching over—with an AM/SSB rig you'll be able to keep in contact with them, even if you still aren't ready to go all out as a full-time sidebander. And, you never know, you might well be so amazed with what you can do with sideband that within only a few months you could decide that you wish to place your emphasis on sideband—you won't have to go out to unload your almost-new AM rig and take a loss, only to lay out more greenstamps to get *another* new rig!

Actually, the FCC thinks that probably someday all CB communications will be on single sideband, just the way that all voice communications on the lower frequency ham bands switched over to single sideband from AM a few years back. So, one way or another, single sideband appears to be the happy fate of CB—and those who are hip and who have some foresight are moving in on it right now—getting in on the ground floor, becoming the pioneers of this new frontier on CB

At the controls of the mighty Browning Golden Eagle Mark III, sits one of the members of the sideband fraternity tuning those "new" sideband channels—36 through 40!



Some people think that sideband gear is huge in size and complex to operate. Nothing can be further from the truth—operation is easy; the "trick" is in knowing the ins and outs of the unique operating practices and traditions used by the operators.

communications! Every day sees more and more "CB'ers" turning into "11 Meter Sidebanders," perhaps getting their ID numbers, learning the operating techniques used on sideband—shopping around for sideband gear, or actually putting it on the air—or at least waking up to the fact that there is such a thing as single sideband and learning what it has to offer. Perhaps the biggest spur to the momentum of single sideband has been the spectacular growth of AM CB'ing and the resultant lack of courtesy and ability to carry on a coherent conversation for more than a few minutes without getting walked on.

Why not talk over sideband with other local operators, even if you're strictly an AM operator? If you're not a sidebander—why not discuss the possibilities of going to SSB in unison with some of your friends? If you are on sideband already, why not explain to those who are seriously interested in better communications what you've got going for yourself.

Now that you've had the road to the future of CB pointed out to you, go ahead and take that first step to sideband! No, you *don't have to* rush right out and get a rig to be part of it all, you can take the first step by getting set to go by obtaining some SSB ID numbers for yourself, by starting to learn the ins and outs of operating practices on the sideband channels—with these to your credit, you've already become part of the new era! Then, when you feel the time is right—next year, next month, or *next week*—you're not a green newcomer to it all!

If the rate that they're assigning sideband ID numbers right now is any indication as to the amazing popularity of single sideband, and if it fortells what is to come, I'd say that NOW is the time for YOU to climb aboard the rocket before it goes totally out of orbit!





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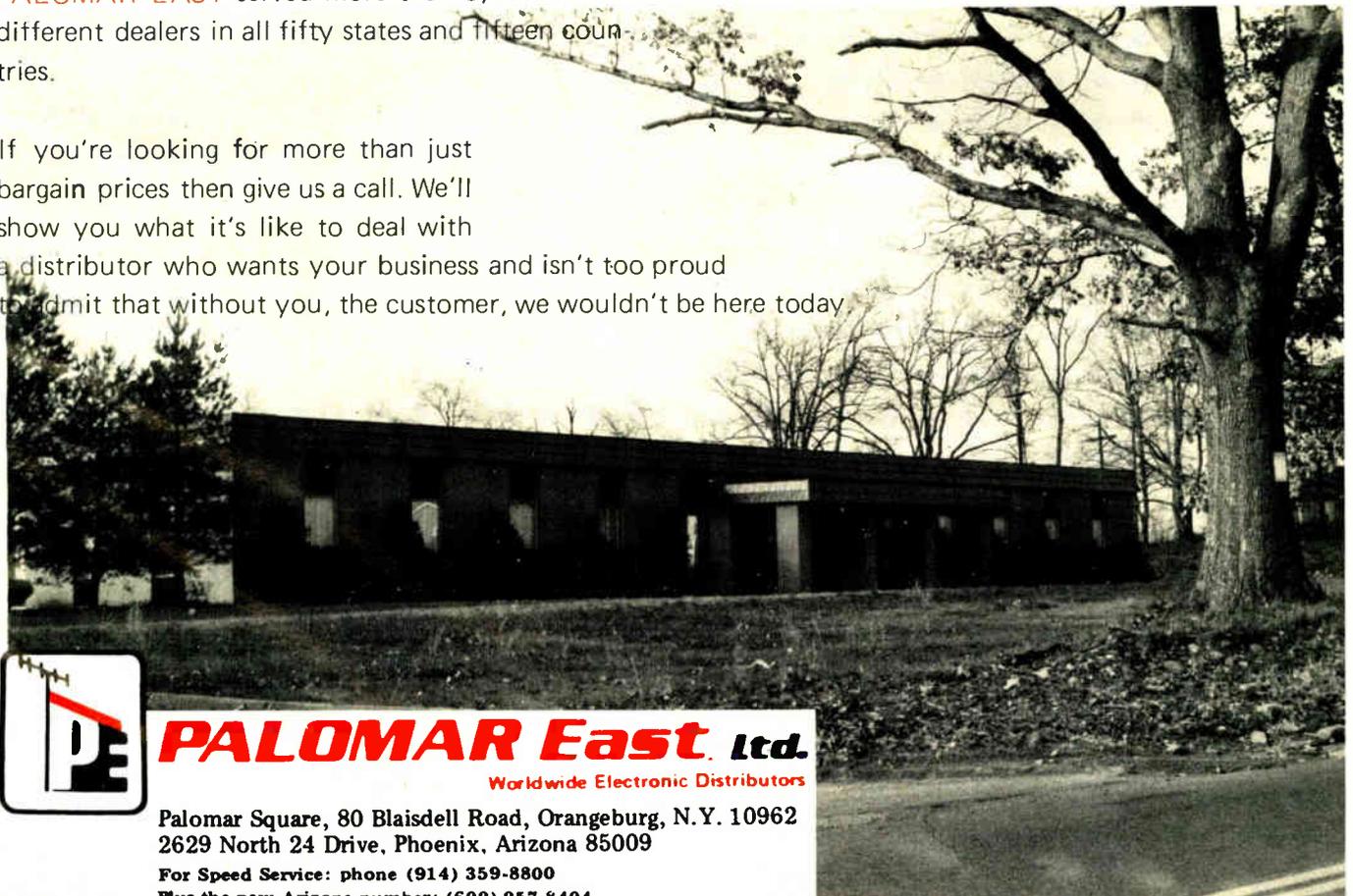
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Have no fear, *Tomcat* is here with the ultimate solution to being unceremoniously bounced off of your favorite channel.

Simply fill in the blank spaces, slice from the pages of CB RADIO/S9 and proudly display this lease to your favorite channel. Hang it right on the wall for all to see—then next time some cottonpicker asks you if you think you own the channel—tell him where it's at—that you may not own it, but, for sure, you've got a 99-year lease on it! They won't argue it with you—let 'em know that you're a friend of the ol' *Tomcat*!

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Be it known that the following Citizens Radio Operator:

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Has been granted full, unquestioned, use of the following CB Channel _____ for a period not to exceed 99 years from the date of this lease. Other area operators shall not be permitted use of said channel without the express authorized permission of said lessee, and any and all unauthorized use of said channel shall be definitely regarded for sure as an act of hostility. All stations within 150 miles of the 10-20 of this station are hereby placed on notice that lessee can become extremely hostile if necessary in order to protect these rights.

This lease granted on behalf of the Editor and all of the other people who hang around the offices of CB RADIO/S9 MAGAZINE.

Lessor: _____
Editor, CB RADIO/S9 MAGAZINE

Dated: _____

Sooner or later you're gonna be up to your ears in heavy traffic, endless static, and bein' walked on.

Ham it up with the S225.

The "S" stands for *synthesized*, which means you get the whole band, without the need for expensive crystals. The first "2" means this band is in the 2-meter wavelength area of the spectrum. And the "25" tells you power output, variable from 1 to 25 watts, continuous wave. AMCOMM's S 2 25. The most advanced, synthesized VHF-FM transceiver available, providing communication capabilities CB can't approach.

A taste of honey.

800 channels. Not 23, or 40 but EIGHT HUNDRED channels, of virtually static free FM communication. With this choice of frequencies available, why are you still waiting to break? If the 25 watt output power of the S 2 25 isn't enough, it can be amplified up to one KILOWATT, legally. But with the S 2 25 that isn't necessary, due to an impressive device called a *repeater*, which is capable of transmitting and receiving signals concurrently.

The S 2 25 has a range of 20 to 30 miles, and a repeater 25 or 30 miles away can rebroadcast your signal 30 to 40 miles, to the "other side". That's a total of 70 miles.

The AMCOMM connection.

The S 2 25 has an optional accessory which in conjunction with a repeater, will enable you to call home *without* your having a base station. The device with push buttons is a *touch-tone encoder*. It allows you to communicate with anyone having access to a telephone in the repeater's local calling area. (Limited to non-business communication). These repeaters are maintained by amateur radio clubs, and you as a member of one club would enjoy this advantage all over the country, through automatic "courtesy membership" in all repeater clubs. With the addition of the touch-tone encoder, your S 2 25 combines the mobility of radio with the accessibility of the telephone system. No base station. No mobile operator. And no phone bill which reads like the Gross National Product.

Seizin' of the switch.

It appears now that many people want something *beyond* CB, such as the ham communication features of the S 2 25. In view of the growing interest in ham radio, the American Radio Relay League (ARRL) expects thousands of CBers to cross over to amateur radio next year. And to make it easier for you to get started, they have put together a basic course package, including an orientation manual, a Morse code practice cassette, and a U.S. call area wall map. You can get this package from your dealer in exchange for seven of your hard earned dollars, or, you can

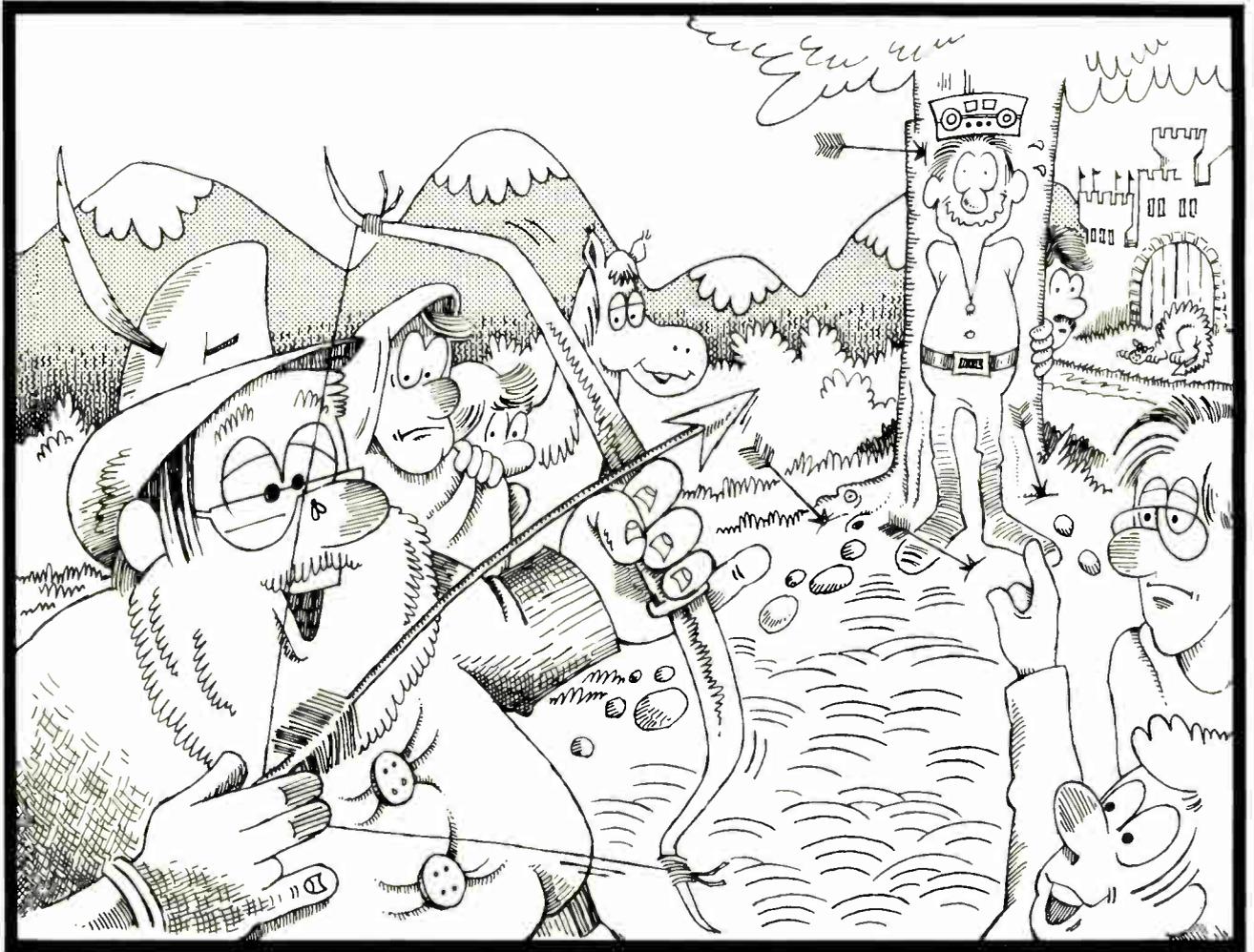
Stash the cash.

When you purchase the AMCOMM S 2 25, we'll give you this ARRL package free and include the official ARRL License Manual. All the information you'll need to get your Technician Class ticket. Bodacious, indeed! For more information write to Steve Fried, V. P., AMCOMM, 730 W. McNab Road Fort Lauderdale, Florida 33309.

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COMING EVENTS!

If you wish your Jamboree or Coffee Break listed in this column, the information must be sent to S9 at least 4 months in advance.

FEBRUARY

Super CB Jamboree, Feb. 6th, Desert Inn, 30-80 Whitestone Parkway. Contact: American CB Radio Club Inc., P.O. Box 321, Bronx, NY 10469.

6th Annual Communications Conference, Feb. 17-20, Mayflower Hotel, Washington, DC. For more information contact Lionel C. Barrow, Jr., Ph.D., Dean, Ms. Peggy D. Pinn, Conference Director, Howard University.

Jamboree, Feb. 26. Event is for charity. Contact: W5M Sidebender 77 Jamboree, Box 12431, Jackson, Ms. 39211.

MARCH

Jamboree, March 4-6, Panama City Municipal Auditorium. Sponsored by Florida State CB Radio Association, Dist. 7 & the Bay County CB Radio Council. For more information contact: Jamboree Control, P. O. Box 10203, Panama City, Florida 32401.

Super CB Jamboree, March 6th, Desert Inn, 30-80 Whitestone Pkwy. Contact American CB Radio Club Inc., P.O. Box 321, Bronx, N.Y. 10469.

APRIL

7th Annual Coffee Break, April 3, Western Kentucky Fair Grounds Convention Center. Monitor Channel 11, KIZ-1934. For more information contact Hopkinsville CB Club & React, P.O. Box 112, Hopkinsville, Ky. 42240.

Jamboree, April 3, Lake Jackson Farms Pavillion, Hwy. 332, Lake Jackson, TX. For more information contact: John Stanford, Sr., P.O. Box 186, Lake Jackson, TX. 77566. Phone: 713/265-4005.

Fourth Annual "Springtime" Coffee Break, April 3, Ill. State Route 1, Milford Grade School, Ill. For more information contact: Faye M. Thomas, 208 S. Grant St., Milford, Ill. 60953.

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Archer antennas are hand-crafted for quality. This expert is putting the final touches on loading coils.



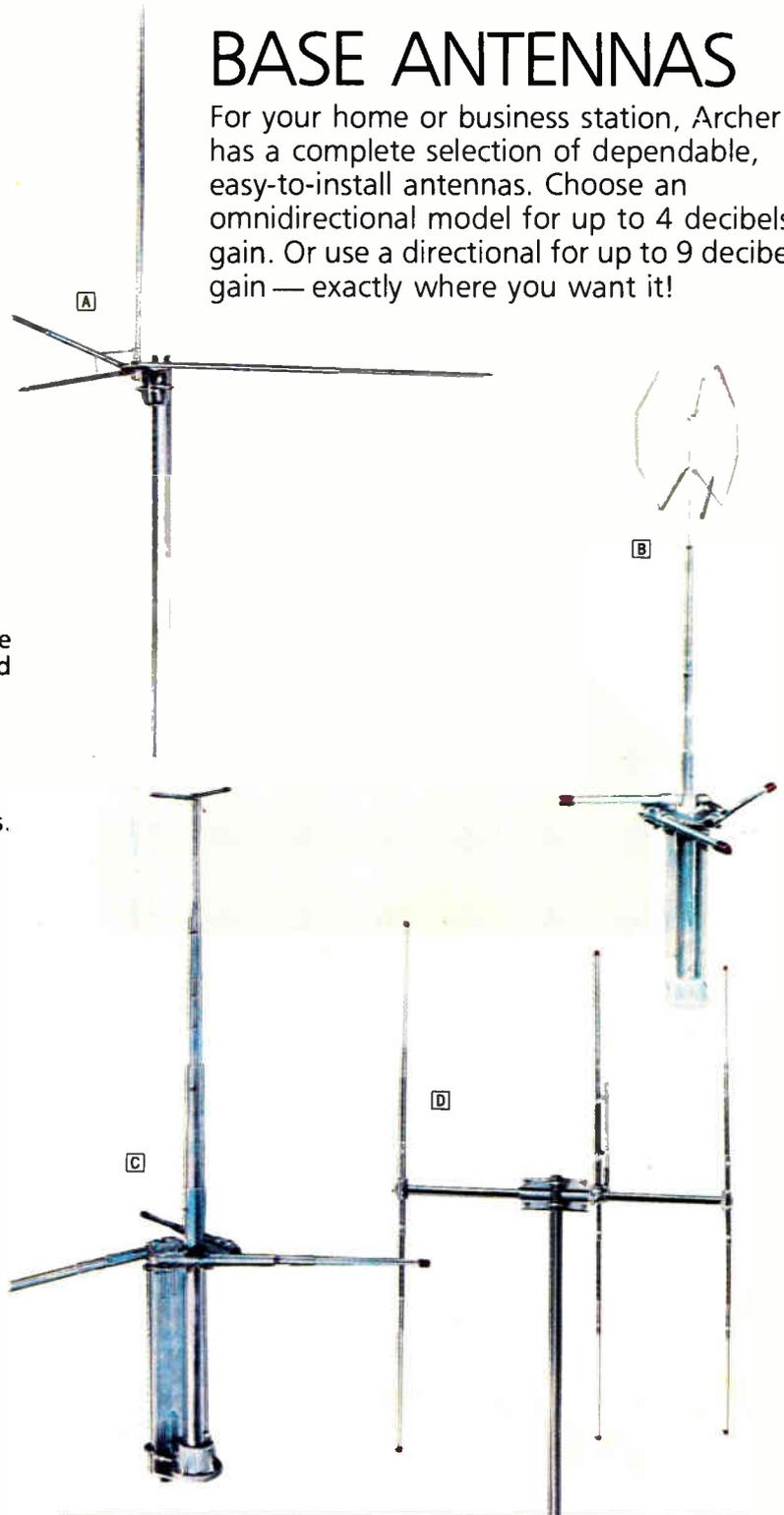
A spectrum analyzer is used to check new and experimental antenna designs.



An engineer field-tests a new model using a laboratory reference antenna.

BASE ANTENNAS

For your home or business station, Archer has a complete selection of dependable, easy-to-install antennas. Choose an omnidirectional model for up to 4 decibels gain. Or use a directional for up to 9 decibels gain — exactly where you want it!



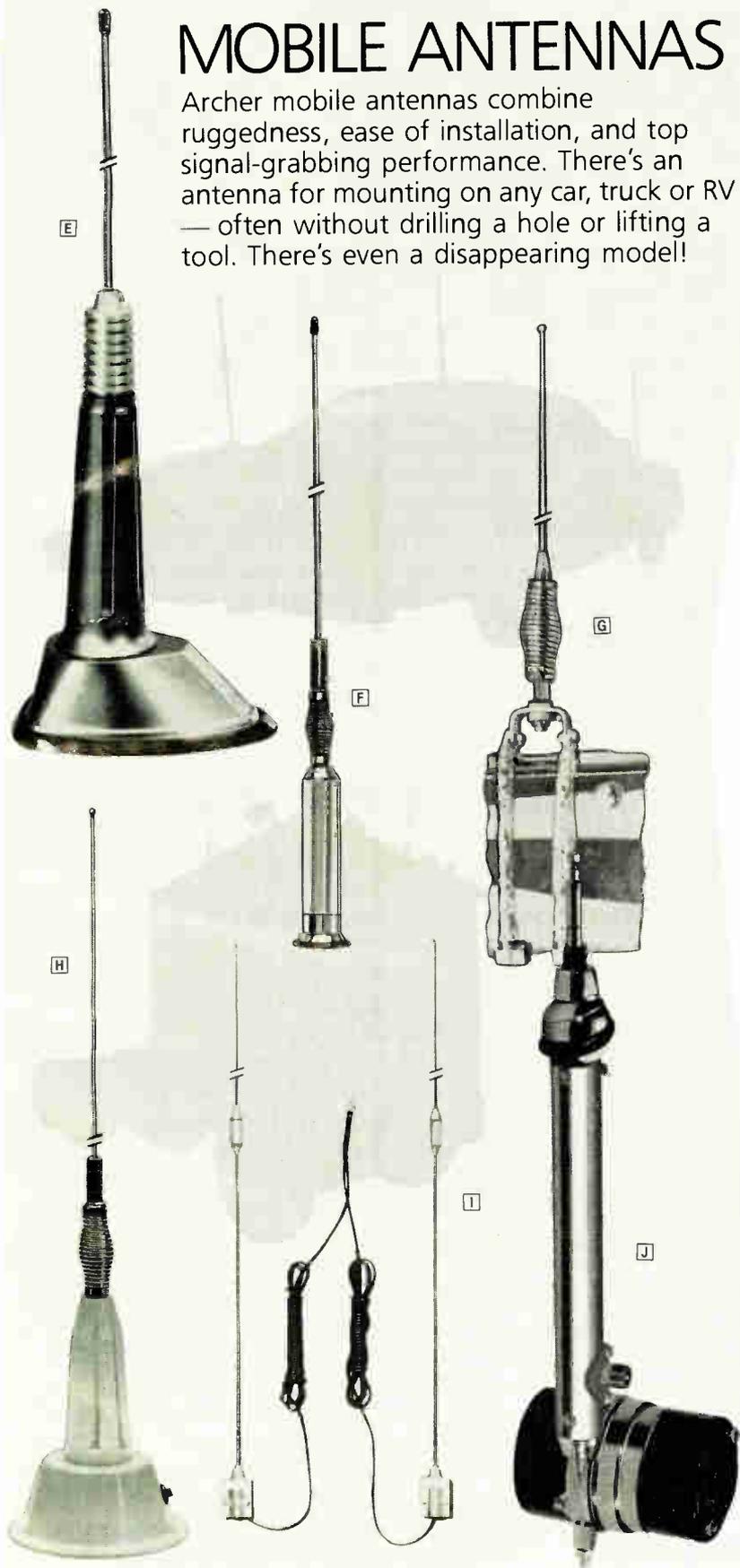
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M Twin Truckers II. Get superior coverage, stronger signal pattern from ahead and behind. Stainless steel, adjustable tip rods. Easy attachment to West Coast-style mirrors. With 18' dual phasing harness, connector. 34.95*

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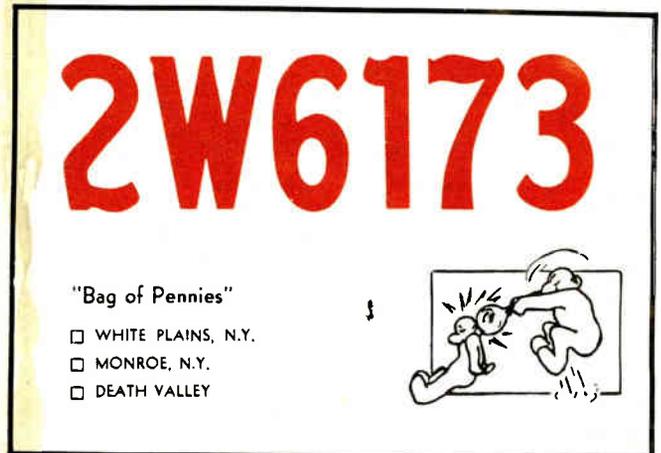
Across The Channels With
S9's Editor, Tom Kneitel (Tomcat/ KEZ5173)

OVERHEARD on 19—Trucker: *What's yer handle?* 4-Wheeler: *I'm from Chicago!* Trucker: *No, yer handle!* 4W: *Oh, I didn't know what you meant, I'm in a silver Mark IV!* Trucker: *#*%# 4-wheelers!!* . . . Nicest thought for the day came from *Baby Cakes* who commented that there aren't any strangers on CB, only friends you haven't met yet! . . . CODED WORD DEPT. I understand that quite a few police departments are abandoning the tried and proven 10-Codes and returning to plain language—they say that it's a lot easier for a busy Smokey to comprehend a message such as, “There's a brawl in Sweeney's Bar,” than something like “10-44, 10-20 Sweeney's Bar.” It appears that a number of departments in the Denver area have already started using plain language. Oh well, somehow I think that CB'ers cherish the 10-Codes too much to give them up at this point! 10-4? . . . Amidst all the hullabaloo about the new 40 channel rigs which are being prepared for CB'ers, something very interesting happened. Some dealers, distributors, manufacturers got sorta nervous about the possibilities that the public demand for 23 channel rigs would be on a par with their desire to own hula hoops and straw hats—so along about September there seemed to be a trend to start moving the 23-channel rigs very quickly to deplete their inventories. What happened was that with so many people trying so hard to sell the 23-channel rigs, and in the present absence of new 40-channel sets—there evolved a shortage of 23-channel CB rigs which many dealers felt they needed to meet the Christmas shopping spree—inasmuch as CB is a sure-fire Christmas item! Along about early November more than a few dealers became aware that they were low on CB equipment to sell—and they were further surprised to learn that public demand for 23-channel sets was still riding high! Result is that there were some unhappy CB dealers who rode out the 1976 Christmas season by watching streams of would-be cus-

tomers passing by their store windows as they sought out those dealers who had the foresight to lay-in a heavy stock of 23-channel gear and keep cool while so many others panicked their way right out of the CB market! Don't forget that all of the mobile AM and SSB services are still on the bottom-half of the band! That's right, Channels 9, 10, 12, 16, 18,19—they're all *bottom halfers!* It will be a while before there will be a sufficient number of services established on top-half to render a 23-channel set less than *highly valuable!* Me? I latched on to a couple of 23-channel sets last week—I'm looking forward to the 40's coming through, but I just couldn't resist getting those 23's at a relatively low price. My suggestion to readers is to look around and pick up any remaining 23's! . . . *Poodle Power* tells me that he developed a clever anti-theft system for his mobile unit when parked. He disguised the rig as a box of tissues. The gutter mount was unclipped, stuffed into a cardboard tube which was then casually rolled up in a towel and tossed “carelessly” under the seat . . . Our nomination for Meanest Smokey In The World goes to the one patrolling just outside of Worcester, Mass. Readers tell me that he's got ears and will respond to any and all requests for 10-13's with the report that *everything's clean and green.* Problem is that everything isn't clean and green because the only green you'll see will be on those greenstamps. He's a front man for a picture taker, for sure—*figure that!* Well here's a message to that Smokey which I was asked to 10-5 from some of your area CB'ers—if you think false reports are so clever, how would you like it if your department started getting false and deceptive reports? Think about it! . . . Sometimes, readers report, there is a gentle *tap-tap-tapping* at the door—no, it isn't *The Raven*, nor is it little Shirley Temple tapping her way into your heart—it's the *big badge wolf* from Uncle Charlie's crib down in Washington. Now, more often than not he's legit and he has every right in the

world to eyeball your CB gear without any warrant. But some readers have wondered if there is any way to double check on the validity of the guy—I mean, not everybody wants to welcome a stranger into their home at some ungodly hour of the night unless they know for sure if he's on the level. One way you might be able to double check on the fellow is by calling the FCC's Watch Officer in Washington—and he's there 24-hours a day. I don't know if it will help, but it probably won't hurt either. The telephone number is 202-632-6975. . . . Inside Info Department: Effective with the Dec. '76 issue of CB RADIO/S9 we are reaching some 1-million readers per month, with a specially prepared condensed edition of our magazine being furnished to many thousands of carefully selected physicians and dentists for their waiting room reading selections. . . . I know a guy who is so small a person that when the FCC issued him a CB license, the callsign had a minus symbol in front of it! . . . I spent a few days in California last October watching Paramount film some of their new \$2-million CB flick, entitled *CITIZENS BAND*—I had an interesting time and will be reporting on my visit in a forthcoming issue. By the way, among the performers in the film are (gasp) Candy Clark, Chuck Napier (a long time CB'er who has written for CB RADIO/S9 in the past), and Ed Begley, Jr., who many of you will recognize as a member of the cast of *Mary Hartman, Mary Hartman*; remember the deaf mute boyfriend of Mary Hartman's sister? As soon as I unpack my notes and develop some film, I'll let you know about these and some of the other personalities and events surrounding the first major studio production of a film centered around CB'ers and CB radio! . . . Speaking of *Mary Hartman, Mary Hartman*, CB radio is being represented in the story-line by the inclusion of a character whose handle is *Miss Tippytoes!* . . . A good buddy of mine is member of the State Police hereabouts—a few weeks ago we spent some time ratchet-jawing over some old CB times. Besides the conversation, he also made me heir to a severe cold he had—however my red nose and miseries were made to feel better when I received a get well card from him stating: *Caution, Smokey can be dangerous to your health!* . . . Radio propagation (skip) reception and interference conditions are forecast weekly via a service called *Dial-A-Prop*, which is offered by our sister publication, *CQ MAGAZINE*. This service covers skip conditions on all bands and comes via recorded message to anyone calling the service at 516-883-6223—other than the cost of the phone call, the service is free! . . . If anybody out there in CB-land knows

where I can get a nice Coors advertising plaque for my office wall, please drop me a card or letter—I particularly like the round plaque with the picture in the center, but I'm not fussy. . . . We received a nice letter from CB pioneer Jess Wyder, formerly 2W6173, now KCY2518, of White Plains, N.Y. Jess' handle, *Bag of Pennies*, dates back to 1962, and he still owns his original Essco CB rig



. . . Most unusual sob story of the month was sent in by a reader who found that his mobile CB rig was ripped off—but there were 2 solid gold earrings on the front seat of his car instead! . . . Every week seems to bring forth new books and publications relating to the CB field—and it seems that far too many of them are richly endowed with tons of material lifted directly from our pages—used *without* our permission, without copyright credit, without authors' credit. While it has always been our policy to grant permission to requests for specific reprints of some of our materials, I think that there comes a point where this crosses over the line and becomes a rip-off. It's a situation which is getting worse by the week—in fact I just saw a copy of one CB dictionary which contains something which I wrote for S9 back in 1972—only now it has no mention as to its actual source, but has gained another author's name and information to the fact that a copyright is being secured. Also this week I received a copy of a newspaper (non-CB) in which feature stories from old issues of S9 are being run apparently as their CB column—no by-line, no credit, no permission. These are a few examples of what I'm talking about. We at CB RADIO/S9 put a lot of time and work into our publication and are not willing to be patsys for anybody who wants to come along and go into business on our talents and our properties. So, just for the record, I've asked our Legal Depart-

ment to actively pursue any and all violations of our Copyright. End of diatribe! . . . Dink, at Unit 166-A, sez that a Smokey in his area told him that the Smokeys themselves are prone to broadcasting false Smokey reports—they say it keeps traffic at a reasonable speed because everyone with a CB rig thinks that there are wall-to-wall bears, when actually there may be only a few patrol cars on duty! . . . Biographical Dept.: Many of those who send me QSL cards and letters include a vast wealth of data about themselves and their hobbies and interests—sometimes printed in tiny type right on their wallpaper—or else included in a 10 page letter. Sorry I don't have anything on myself prepared to return in exchange, but for those who have asked about what else occupies my head and my time other than CB radio, I pass along the following synopsis: I'm a member of the Archeological Institute of America, the National Geographic Society, The American Parapsychological Research Institute, The American Society of Medical and Professional Hypnotists, and a few other organizations. I'm also into Ham radio and sports cars. Other than that, plus CB radio and this magazine—I have plenty of free time! . . . Here's a short but worthy poem from DRACO-1, of Orrington, Me., who writes: *Breaker Breaker for the skip/Hey good buddy make the trip/Take a chance and we will see/If we can duck the FCC!* . . . We Liked: A new book with the interesting title of *The Best Book on CB*, by Evan Herbert, which we recently issued by H. P. Books (Fisher Publishing Inc.). It sells for \$4.95 and very capably covers a very large spectrum of CB information . . . Interesting occupations: *CB'er House Doctor* lives up to his handle—he's a plumber. Says he makes house calls day or night! . . .

Tomcat!

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ON THE COUNTERS



MOBILE CB TRANSCEIVER

The Royce Model 1-658 incorporates THE WIRELESS chassis—Royce's revolutionary new innovation in citizens band radio design. THE WIRELESS is a manufacturing procedure utilizing automated assembly of modules on modern production lines. Each module is automatically tuned and tested to strict computer programs. There are no wires connecting modules. Not one point on the modules or chassis is soldered by hand. And, each circuit module is mated to the master board by precision assembly techniques.

The Model 1-658 features: Vol-U-Mike, that allows adjustment of receiver volume level from microphone or front panel; large illuminated 1¼" x ¾" S/RF meter; exclusive IC audio stage with 6 watts RMS; amplified AGC circuit; three ceramic filters; dual conversion receiver plus tuned RF stage; metal case RF output transistor; positive or negative ground operation for any vehicle, with plug-in DC cord; relay switching; L.E.D. transmit light; AMC circuit; fully variable squelch control; large 3" speaker; pushbutton ANL switch; pushbutton PA/CB switch; continuous RF gain control and fine tuning; accessory jacks for external speaker, P.A. system, antenna and DC power cord; and a rugged scuff-resistant, vinyl-clad metal cabinet.

For more information, contact Royce Electronics Corporation, 1746 Levee Road, North Kansas City, Missouri 64116.



40-CHANNEL CB UNIT WITH WEATHER MONITORS

Boaters and landlubbers alike will for the first time be able to obtain around-the-clock information on atmospheric conditions with a new 40-channel Citizens Band (CB) radio announced by PACE.

The 8050 40-channel CB unit will provide continuous, 24-hour monitoring of National Weather Service reports on PACE's exclusive Weather I or Weather II settings, at the flick of a switch.

In addition, the 8050 features include: large scale integration to reduce unit size by micro-miniaturization of components; L.E.D. channel display; noise blanker switch to cut static-type noise from automobile engine and ignition systems; RF gain control knob to adjust receiver sensitivity; delta tune for fine-tuning of incoming transmissions; S/RF meter for monitoring incoming signal strength and relative power output; and transmit and receive indicator lights.

Contact: PACE, 24049 S. Frampton Ave., Harbor City, CA 90710.

TWO NEW MOBILE CB ANTENNAS

As part of the ongoing re-entry of EICO to the CB field, two antennas have been introduced by EICO.

The Gutter-Clip Model, CA-20 features a center-



loaded whip that attaches directly to the rain gutter clip of any car, truck or recreational vehicle without the need for drilling or screws. The antenna is only 21 inches high, features a tunable stainless steel whip, a nine foot coaxial cable terminated with a PL-259 standard coaxial connector.

The Trunk-Lid Model CA-10 is a base-loaded unit that attaches to the trunk lid without the need for screws or drilling. It features a neutral-grey coil housing that will blend with the color of any vehicle, has a chromed base and spring that seats on a rubber base cushion. The overall length is 45 inches, and the unit is equipped with 15 feet of coaxial cable terminated in a standard PL-259 connector.

For those that prefer a permanent installation the Model CA-30 can be mounted directly to the trunk lid or roof of the car by simply drilling a 3/8-inch hole.

The Model CA-20 is priced at \$19.95 and the Model CA-10 at \$24.95.

For further information contact: Mark Ehren (212) 272-1100, EICO Electronic Instrument Co., Inc., 283 Malta Street, Brooklyn, N.Y. 11207.

UNDER-DASH 40 CHANNEL CB TRANSCIVER WITH DIGITAL READ-OUT

Boman Industries announced an all new under-dash 40 channel CB transceiver with digital channel read-out. Designated the CB-765, this unit offers electronic tuning permitting the receiver to discriminate between signals and locking in on the strongest one. The CB-765 incorporates digital synthesis and phase lock loop circuitry for optimum frequency stability. Equipped with RF gain control the receiver offers fine tuning for incoming signals.

Other features include: noise blanker control; squelch control for quiet standby; automatic scanning control for each of the progressing 40 channels; transmit and receive mode indicator lights; S/RF meter for monitor-

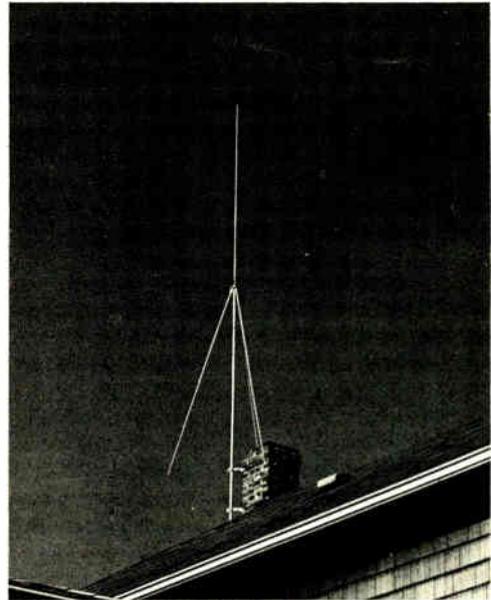


ing incoming signal strength and relative power output; PA system and external speaker jack.

Unit operates on positive or negative ground.

Boman Industries, located near Los Angeles, is one of the nation's leading designers and manufacturers of CB radios,—in-dash and under-dash—, antennas and accessories and in-dash and under-dash AM, AM/FM AM/FM/MPX car radios, cassette and 8-track cartridge car stereos, speakers and accessories.

Contact: Bowman Astronix, 9300 Hall Rd., Downey, CA 90241.



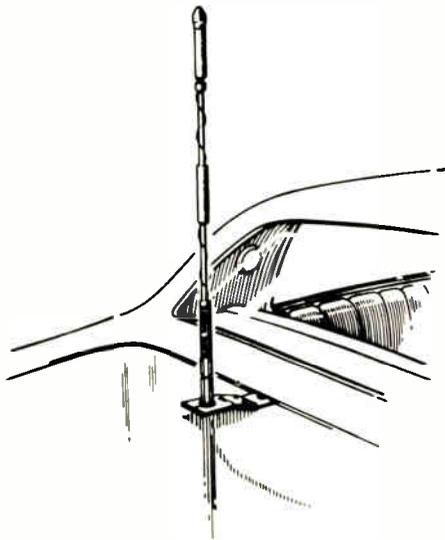
FIBERGLASS BASE STATION ANTENNA

Military grade fiberglass and the all around high quality construction of PACER'S base station antenna have opened the doors to the "home 20's" of value minded CB'ers. Radiating elements totally enclosed in this tough, good looking white fiberglass, made the omni-directional 5 dB gain SUNBURST untouchable by weather and other outdoor influences and give it a consistently low SWR reading with no maintenance. Another Pacer bonus is ease of installation. The Sun-

burst can be assembled in minutes and mounted in the desired location with a minimum of effort.

Miami based Progress, Inc., manufacturers of the Pacer line of Citizens Band antennas employs fiberglass in the production of its entire antenna line. Pacer's mobile antennas range in size from 19" to full quarter wave whips and include all popular antenna mounts. Pacer antennas are Top Coil Loaded and feature Finger-Tip Tuning. The unique process by which these antennas are manufactured has rendered Pacer invincible to the FCC's announcement of 17 additional channels. Pacer performs across all 40 channels without a rise in the SWR reading. Most antennas are designed to function on 23 channels and will either not operate on 40 channels without an intolerable rise in SWR or will require major adjustments.

Contact: Progress, Inc., 3321 N. W. 79th Avenue, Miami, Florida 33122.



TRUNK LIP BRACKET MOUNTS 3 WAYS

Communication Products Manufacturing, Inc. maker of communications antennas, mounts and accessories, here, today introduced a new Long Ranger CB antenna with trunk-lip mount for CB antennas.

Designated the LR-4S (4' antenna) and T.M.-1 (trunk-mount bracket) the combination's suggested list price is \$31.90.

The mount is a versatile, two-piece, three-position bracket that adapts to rear-deck lids and rear-trunk lips on most vehicles. The 45-degree position assures a secure mount on fast-back vehicles. It can be mounted on hood lips with the 90-degree option.

Constructed of heavy gauge galvanized steel that will not corrode or bend, the T.M.-1 trunk-lip bracket is lined with felt to prevent damage to the vehicle's finish. The bracket can hold the company's Long Ranger antenna recommended for 23- and/or 40-channel transceivers. "The fiberglass antenna is pre-tuned, pre-tested, and triple-loaded to have an RF gain of 50

to 100% more than other base-loaded types," according to Tom Carr. The antenna comes in five lengths and is the only rod offered in a choice of seven colors.

No drilling or special tools are required for the bracket's easy installation. The mount is complete with all hardware and Long Ranger's quality, 3/8" x 24-thread antenna mount coupler.

Contact: Communication Products, 10025 E. Montgomery Dr., Spokane, WA 99206.



FULL FEATURE 40-CHANNEL BASE STATION WITH AUDIO COMPONENT STYLING

The Hy-Gain VIII (3108) is a full feature base station transceiver designed for the most particular CB user. It transmits and receives all 40 channels and features advanced Phase-Lock-Loop circuitry plus LED digital read out for all 40 channels and time.

There's sophisticated noise cancelling circuitry including switchable ANL (automatic noise limiter) to help reduce atmospheric noise. And switchable noise-blanker to help eliminate man-made noise. 4 full watts output on AM and superior sensitivity (1 μ V at 10 db (S+N)/N) to help pull in even distant signals.

Audio component styling provides unique lay-down cabinet design with simulated walnut wood grain side paneling and a handsome black-out face which sharpens separate lighted signal/modulation and SWR/RF meters and receive and transmit LED indicators with digital read out for time and channel.

Separate easy to use controls for volume, channel selection, squelch, function, fine tuning, tone, RF gain, SWR calibration (for measuring antenna performance) and PA complete the package. Manufacturer's suggested retail price is \$449.95.

RADIO SHACK CATALOG: FREE

Radio Shack's 1977 Electronics Catalog, featuring their exclusive line of products for home entertainment, hobbyists, CBers and experimenters, is now available

For Information About Our Advertisers . . .



from Radio Shack stores and dealers, nationwide.

The all-new 164-page catalog includes 100 full-color pages describing the company's complete line of products. Prices in the new catalog, which marks Radio Shack's 56th year in business, are reported to be, on the average, within 1% of the company's average 1975 prices.

Among the new items introduced in the catalog are: eight new stereo FM/AM receivers, led off by the Realistic STA-2000 75-watt per channel receiver, the Optimus T-100 Tower speaker system, the new LAB-300 turntable and several new stereo tap cassette recorders.

Radio Shack is also introducing an all-new line of pocket calculators ranging in price from \$10.95 for a 5-function model, to \$39.95 for a scientific slide-rule calculator.

Other items featured in the catalog include: Realistic-brand CB two-way radios, automotive tape players, portable radios and scanning monitors, Archer antennas, Micronta test instruments and ArcherKit and Science Fair electronic and hobby kits.

In addition, the new catalog lists hundreds of specialized electronics items, parts and accessories, tools, tubes, semiconductors, wire and cable, home security products, intercoms, microphones, timers, batteries and a complete library of Radio Shack's own books on electronics and related subjects.

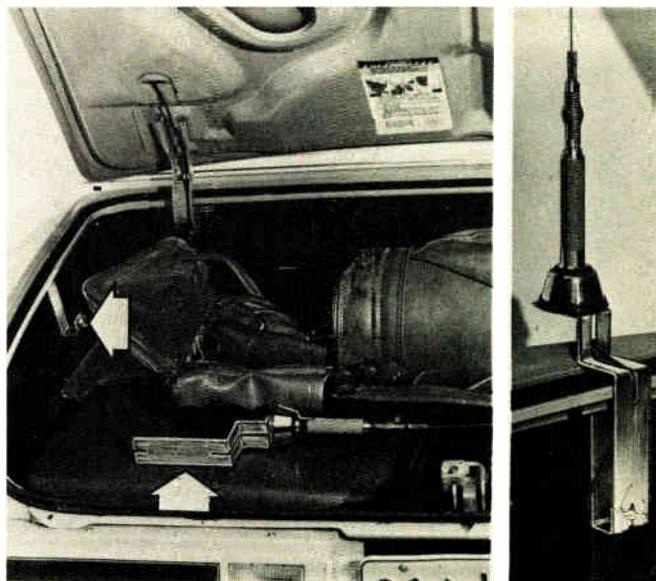
The catalog also includes bonus coupons good for a 50% savings on the company's own Supertape and Realistic brands of tape, and a coupon worth \$1.00 on the purchase of their \$1.25 book, All About CB Two-Way Radio.

In announcing the new catalog, Radio Shack president Lewis Kornfeld stated, "That great old American institution, the Radio Shack catalog, has just been published again, entirely revised, available in all our stores, and still free! Free to you. To us it represents an investment over \$3 million.

"The total printing comes to 2,132,000,000 pages,"

... Use S9 READER SERVICE.

Kornfeld continued. "Stretched end to end: 1,777,777,777 linear feet or 336,700 miles, or 13.525347 times around the world at the equator. The new 1977 edition consumed 3787.5 tons of paper and 1,222,000 pounds of ink. These statistics are revealed to discourage our competition. And to give cheer to America's postmen who don't have to deliver the catalog since none are mailed—you'll have to get your copy at one of our stores."



NEW "HIDE-IT" TRUNK MOUNT PREVENTS CB ANTENNA THEFT

"Hide-It" is a new quick disconnect trunk mount for CB antennas from RMS Electronics, Inc., Bronx, N.Y., 10462. Detachable, the mount and antenna can be placed almost anywhere in the trunk of an automobile. There is no need to unscrew the antenna from the mount. It detaches quickly for storing and does not interfere with the tire, jack, luggage, etc. The "Hide-It" mount and antenna is easily attached into its secure operating position. An adjustable bracket fits most cars and accepts most CB antennas. Attractively chrome finished, the mount is complete with a self-adhering rubber strip to protect the car's finish. The mount also secures the coaxial antenna cable in place, and is self-grounding.

The RMS "Hide-It" CB antenna trunk mount is peg-hang packaged in an eye catching full color printed carton complete with easy to understand step by step installation instructions. The mount, model #CBTM-20, has a list price of \$11.95.

Contact: RMS Electronics, Inc., 50 Antin Place, Bronx, N.Y. 10462.

PRESIDENT ELECTRONICS DEBUTS

The latest company to enter the CB market is President Electronics, Inc. The president of the new firm is Mal Parrish, former Vice President and General Man-

ager of Pearce-Simpson and founder of CB Unlimited in Miami, Florida.

The new company will begin marketing a full line of mobile and base CB units nationally in January, 1977. All will be 40-channel models.

"Our initial line", said Parrish, "will feature both AM and single sideband radios positioned at every important price point." "Many years of experience in the industry allowed us to choose the right features at the right price."

President Electronics' headquarters—40,000 square feet of executive offices, warehouse and service center—are currently nearing completion at a cost of approximately one million dollars. Parrish projects a staff of 65 by the first of the year, with five company men in the field and five telephone salesmen operating out of the firm's headquarters.

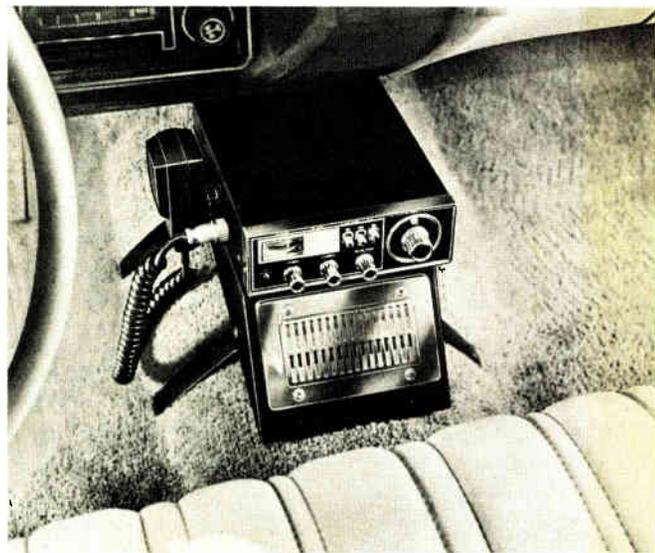
President has already retained the advertising agency of Boylhart, Lovett & Dean to create what he described as "an extensive advertising campaign". The agency formerly served both Craig and Pioneer Electronics.

According to Parrish, distribution of President products will be two-step.

"We're going to avoid the kind of outdated distribution entanglements plaguing many older CB companies and start out right", Parrish said. "We're looking for good, solid distributors—it's the best way to build a good, solid dealer organization."

Parrish has over 20 years' experience in personal communications, sales and manufacturing with companies like Raytheon, RCA, Marine Equipment Distributing and, finally, Pearce-Simpson. In 1975, he founded his own distributing company, CB Unlimited.

Distributor inquiries may be made by telephoning (714) 556-7355.



CB HUMP MOUNT

A CB radio mount, designed to fit the transmission hump of most cars and light trucks, has been introduced to the CB market by Oaktron Industries, Inc.

Named the "CB Sound Saddle," the unit contains a built-in 3" X 5" speaker specially designed for voice communication, according to Jerry Disch, Oaktron's National Sales Manager.

"The new CB Sound Saddle aims clear, crisp sound right at the driver, not at the floor," Disch noted. "It puts controls within safe, easy reach. Special adjustable legs keep the unit and radio on the hump over bumpy roads and tight corners even when not permanently attached. The compact unit can then be easily removed for safe keeping."

Oaktron's new CB Sound Saddle is fully adjustable and comes with a choice of three grille finishes: Black Enamel; Walnut Woodgrain; Chrome Plate. Includes all hardware. No tools are needed. For further information: Oaktron Industries, Inc., 1000 30th Street, Monroe, Wisconsin 53566.



40-CHANNEL TRANSCEIVER WITH THREE-WAY METER

Hy-Gain has announced six 40-channel units for citizens band transceivers.

The Hy-Gain III (model 2703) is an advanced Phase-Lock-Loop citizens radio that transmits and receives on all 40 channels. It employs true noise blanker plus ANL (automatic noise limiter) to help eliminate both atmospheric and man-made noise.

Features include a front panel built-in illuminated Three-Way Meter for monitoring signal, RF and antenna performance. A separate SWR bridge is provided for adjusting antenna measurements. There's separate RF gain control. PA provision for public address capability. External speaker jack. Unique floating ground that accepts positive and negative without switching wires or opening the unit. And 40 channel selector with electronic digital read out.

Modulation is adjusted to maximum levels by built-in automatic mic level control and range boost circuitry. There's a full 4 watts output power. And TVI (television interference) filter. Manufacturer's suggested retail price is \$229.95.

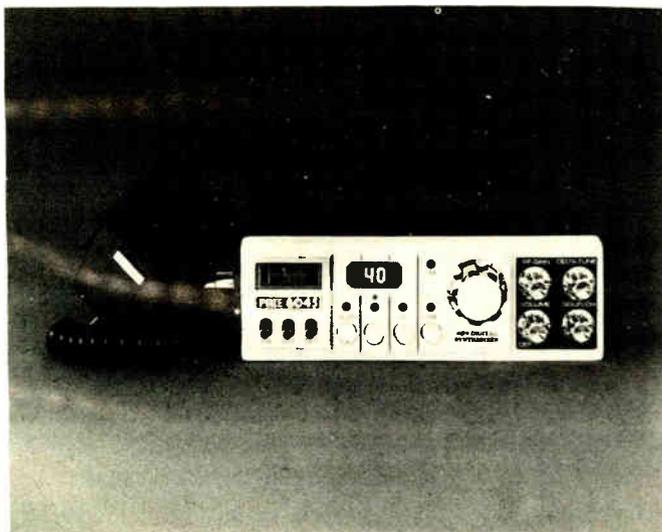
CB ANTENNA THAT DOESN'T LOOK LIKE IT

"The Little Fooler", the new AM/FM/CB antenna by Anixter-Mark, deters theft simply because it doesn't look like a CB antenna. It looks like an ordinary three-section telescopic antenna that extends from 22" to 57".

This disguised CB antenna also delivers unique performance. It transmits and receives CB simultaneously with AM and FM. There is no distortion or loss of reception on the AM/FM band, while punching out a clear CB signal.

"The Little Fooler" covers all the channels on the CB band, plus easy coupler adjustments allow new channels to be tuned-in (VSWR of 1.2 to 1 on any of the 40 channels.)

The complete assembly includes "out-of-sight" universal mounting coupler, high quality coaxial cable with connectors and easy to mount cowl antenna.



SCAN-ALERT 40-CHANNEL CB

Citizens Band Radio technology took another step forward with the announcement by PACE, that it will have available the first CB mobile transceiver capable of scanning three channels.

The PACE Scan-Alert CB (Model 8045) will offer continuous and sequential monitoring of channels 9 (official emergency frequency), 19 (traditional truckers' frequency), and one other buyer-selected channel, in addition to the 40-channel transceiver capability.

Once a given channel is activated by an incoming transmission, scanning stops until the conversation is terminated. At that time, unless the channel is locked

in by pushing a special button, scanning begins again, automatically.

This CB industry innovation will multiply the users' listening opportunities. Moreover, it will provide added safety by allowing the operator of a moving vehicle to keep his attention on his driving instead of being concerned with manually changing channels.

The Scan-Alert CB will be ideal for truckers, police, towing services, emergency assistance groups or anyone else who needs to know what is happening on the road.

Among its many other features, the Scan-Alert CB will offer L.E.D. digital channel display, S/RF meter for monitoring incoming signal strength and relative power output, automatic noise limiter (ANL), Min./Max. RF gain switch for receiver sensitivity adjustment, and transmit indicator light.

CB CASSETTE

A cassette tape series that presents the ABC's of CB in easy-to-understand fashion has been introduced by Edu-Tronics, Inc.

According to Edu-Tronics President Theodore J. Wilson, the development of the CB tapes represent the first time that "anyone has really tried to take the mountain of available CB data and condense it into a single source package that is a virtual gold mine of citizens band radio information."

Two CB tapes are available now; a third tape is being completely revised pending new FCC regulations regarding 40-channel CB operation.

Tape One, which serves as an introduction to CB, is geared to the person who is thinking of getting into citizens band radio. General CB information, along with buying and installation tips, are covered in depth.

Tape Two is much more technical in nature, and provides a complete presentation on CB accessories—what they are, how they can improve performance, how they operate.

When available, Tape Three will be devoted to the upgrading of CB equipment.

Each cassette is 30 minutes in length (15 minutes each side) and packaged in a plastic box. A colorful narration is provided by Jack Baker, a popular announcer at Milwaukee's largest radio station—WTMJ.

Each cassette is priced at \$9.95; the set of two cassettes, \$17.95. Check or money order must accompany the order. For further information, or to place order, write Edu-Tronics, a division of Wilson, Picciolo & Krymkowski, Inc., 6144 Beloit Rd., West Allis, Wisconsin 53219. Phone (414) 327-5040.

(continued on page 114)

Correction: In our October issue, page 62, Craig Corporation's Model 4201, was incorrectly listed. This should have read \$239.95.

15 16 17



S9's Monthly Column for Sidebanders

by Bill Sanders,
CLI-1849, KW-5304
SSB-295

BREAK...LOWER SIDE

ON THE HIGH FREQUENCIES

HF operators are still reeling under the loss of a nice hunk of their favorite turf, presently occupied by new CB Channels 31 through 40—however they seem pleased that sideband operators around the country are generally supporting the use of Channels 36 through 40 for sideband-only use. We feel that they are in for a big surprise when the AM'ers start moving in on their former calling channel, 27.325 (now Channel 32). An alternate HF calling channel has now been decided upon by some of the HF people, this being 27.425. They still consider HF to exist from 27.315 (Channel 31) right on past the upper edge of the band at 27.405 (Channel 40) and thus onward to 27.585. Some of the HF enthusiasts are also suggesting CW in the "band" 27.500 through 27.520.

Meanwhile, the group of enthusiasts who refer to themselves as VHF operators, that is, those who formerly operated above 27.495, have now been shoved upstairs by the HF operators, who, in turn, were pushed northward in frequency by the new FCC authorized frequency expansion for CB. The new VHF calling frequency is 27.595, with VHF "channels" going upward in frequency in 5 kHz steps above 27.595 to about 27.755 or so.

Let me remind our readers that no operations above 27.405 are authorized for CB operation, even though for years these frequencies have been in relatively heavy use by so-called HF and VHF operators. All such use is against *this* many regulations!

Last, and least, we have the so-called UF crowd which operates with a call frequency at 27.805 and their working frequencies directly under the south-side edge of the 10 Meter Ham band.

Let me remind our readers that Uncle Charlie does not permit CB operators to utilize frequencies higher than 27.405 (Channel 40), and any goings-on above those frequencies are strictly verboten! Nevertheless these frequencies have been in rather heavy world-wide use by 11 Meter operators for a number of years now, and we thought that you'd be interested in seeing how the new channels (which are within the stomping grounds of the unauthorized operation) have affected those fans who frequent this portion of the radio

spectrum. We do *not* suggest to our readers that they operate on any frequencies which are not authorized by Uncle Charlie, and most especially caution any of our readers who are UF enthusiasts that should you stray into the 10 Meter Ham band (28.000 and above), that the ARRL has told all of their members to turn you in to their headquarters so they can get Uncle Charlie to hassle you. I always knew there was something I just *loved* about the ARRL!!

CONVENTION INFO

While some operators reported that they had a good time at the SSB Convention last year in Colorado Springs, the majority whom we heard from thought it was a flop. Also, a lotta guys had some super deluxe sideband gear ripped off from their parked cars. Next year the 6th Annual National Sideband Convention will be in Tulsa (July 15 to 17), better luck next time!

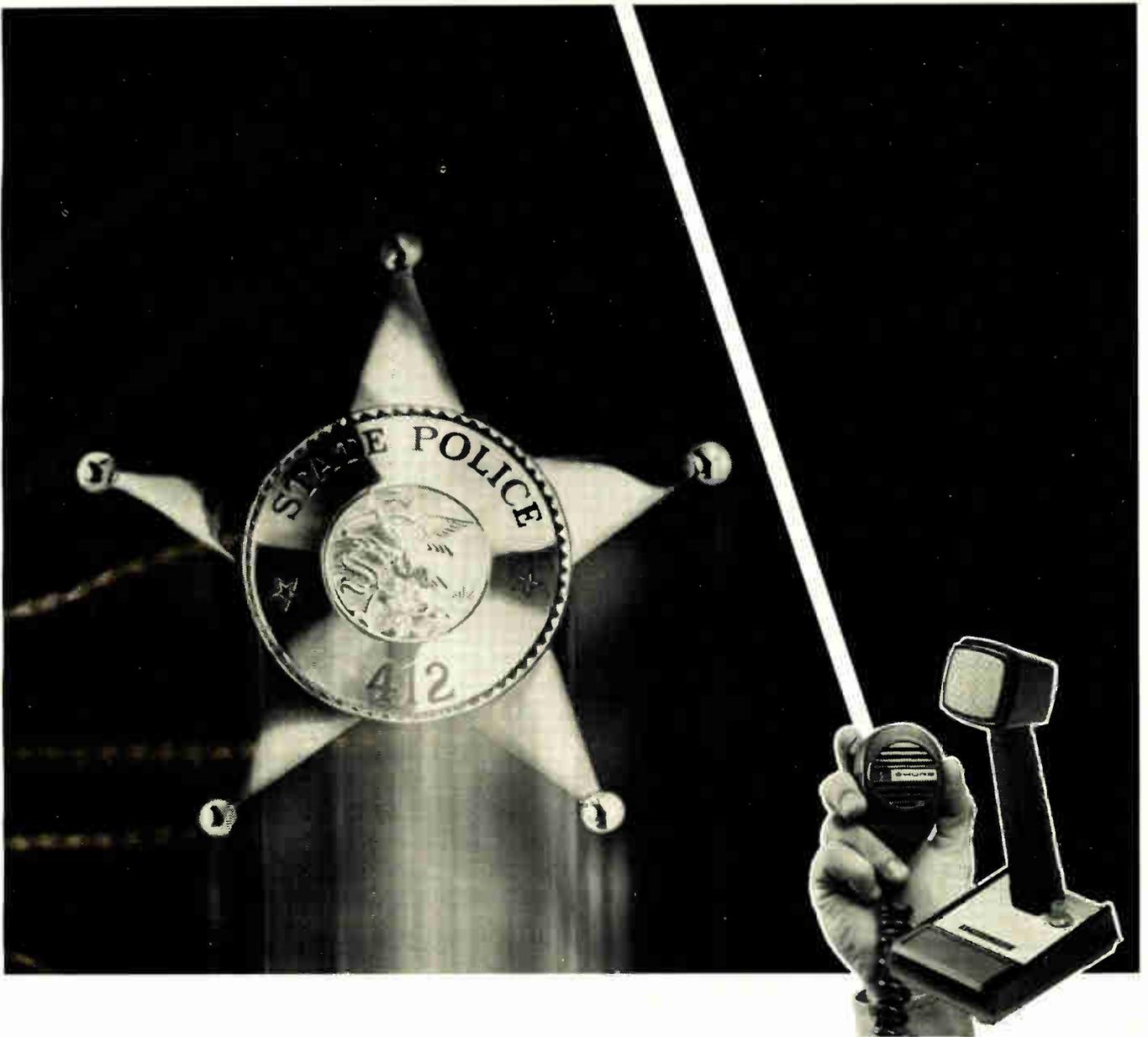
This month there is a Florida Sideband Gathering (although out-of-state sideband operators are welcome) taking place February 26th at the Altemonte Springs Inn and Racquet Club, 151 North Douglas, Altemonte Springs, Fla. They expect operators from about 25 states to start arriving on Friday, the day before the Gathering. On Saturday there is a luncheon which costs \$5. Motel rooms *may* still be available by the time you read this—give a land-line to Jean Borsa at 305-862-5521 for more information on accommodations. Tell these folks that *CB RADIO/S9* sent you!

NET TIME

Sidebanders in the area of Gloversville, N.Y. might wish to check into the weekly network of the *Great Adirondack SSB Club* and get information on becoming a member of this group. The network is on Sundays between 5 and 6 PM on Channel 1-Upper (the upper side of 1 is a new one to us here at S9!).

In many areas of the country there are informal gab-fests with members of the national *SSB Network*. These take place at about 8 PM local time on Sundays, Channel 16-Lower. Just call "Q-R-Zed the SSB Network."

Historical note: Several readers have written to ask about the background of the much talked-about *SSB Network*—how, when, and where it all began. Started



The microphones of the stars.

Now you can have professional reliability in a Shure CB microphone. This means 100% more "talk power" than the utility mics usually supplied with CB rigs.

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Model 526T has a transistorized preamplifier, dynamic element, variable output level control, and is usable with electronic or relay switching.

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1st PRIZE



A MIDLAND CB

2nd PRIZE & 3rd PRIZE

A SHAKESPEARE ANTENNA
Single 4' top loading trunk mount

TUNE IN TO THESE SIMPLE INSTRUCTIONS

1. Sketch your ideas of CB "fun" emblems. Any shape, size or colors. See sample.
2. Decision of the judges is final. Contest ends 2/15/77.
3. Submit as many ideas as you want. None can be returned, all become the property of A-B Emblem Corp.
4. Winning sketches will be made into "fun" patches; copyrighted and available only from us.

How about it?



Complete sets of official
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MORE
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Sample Idea

Breaker, Breaker

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back in 1964 when Russ Walters, a sideband enthusiast in New York City, began using his new *Mark Sidebander* rig—several other *Mark Sidewinders* were already in use in his coverage area and eventually the gang formed a network on the lower side of Channel 16. Instead of handles, the stations all started using ID numbers because they seemed to have a certain something—perhaps dignity, for lack of a better word—than *handles*. There were eighteen operators in the original group—and each took an ID consisting of the letters SSB followed by a number. Russ became SSB-1, for instance, since it was his idea. Others included Tom (SSB-13), Jim (SSB-9), Gary (SSB-17), Tony (SSB-18), Gerald (SSB-8), Diana (SSB-16), to name just a few. The group met on 16L at regular scheduled times to mutually amaze each other about the wonders of what could be done with sideband communications. By 1965, other local and distant operators started checking into the net—some with their own ID's, others requesting an SSB network ID number and being given one. The next *big* boost came in 1967 when sideband gear started becoming more plentiful and the *SSB Network* took a rather sharp increase in membership, and it has steadily grown ever since. Today there are members in all states, in Canada, and in several overseas territories. A large number of prominent people in the CB industry and in politics, medicine, and the entertainment field belong to the *SSB Net*. Unlike some of the more recent so-called "national sideband clubs" to come along—which seem to be quickly tossed together conglomerations not representative of any actual group of active operators, and mostly interested in raising cash by peddling overpriced T-shirts, ashtrays, or the like—the *SSB Network* will happily grant operators ID numbers from their regular numbering blocks *at no charge*—in some areas you can get them right over the air on the sideband channels from local operators who have been given blocks of these ID numbers by the *SSB Network*. So it's ended up as not only the oldest, but also the largest (thousands of stations) sideband network on the channels. There are also little bits of odd adoration from "outsiders"—for instance, the sideband columnist for another CB publication has just begun calling himself "SSB-1," even thought no such ID was ever assigned to him by the *SSB Network!* I suppose you might call it flattery, or *maybe you might call it something else!* Russ, the original SSB-1 tells me that the other fellow is probably a nice guy, and although his recent use of Russ' well known ID is a bit tacky and of questionable ethics, Russ doesn't want to get into one of those "you stole my handle" tiffs which take place on the AM channels. He feels that sidebanders are *supposed* to be above such antics—we agree, too bad that some of those who purport to speak for and to sidebanders stoop to this stuff. Well, be forewarned, that when you see someone other than Russ calling himself "SSB-1," that he's not only self-ordained (so to speak), but also trying to fool some operators into thinking that he's trying to palm himself off as the

founder of the SSB Network—which, of course, he isn't! Too bad he couldn't think up something more original. As a member of the SSB Network, I personally think it was a cheap and tricky move at trying to achieve "instant fame" in a national group which has never issued him any membership ID number. Maybe he owes sidebanders an explanation— what do *you* think?

LOCAL CLUB NEWS

On the local club scene, the Ambrow Valley Side Band Club, in Illinois ("AV" ID numbers) started almost 5 years ago and now has 450 members from Chicago to Mt. Vernon, from Indiana to Iowa. They are on 15L or 16L. Operators in that area wishing further details, contact Nick Bowman, AV-101, RR #2, Toledo, Ill. 62468.

Serving about 200 miles surrounding Columbus, Ga., is the North American Radio group. This includes Phenix and Ft. Benning. For more info, get ahold of Rick Dillard, NAR-1, Rustin Motor Court, Hamilton, Ga. 31811.

The Voice of The South Club, in Tuscaloosa, Al, uses a system of ID's involving the number of the county and the operators' individual membership number. They use 16L. Stan Thornton (who is also SSB-2060) says to contact him for more info if you're in Alabama. Stan's VOS number is VOS-6335, his QTH is 58 Cherokee Hills, Tuscaloosa, Al. 35401.

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Anatomy of a Scanner

by Gordon West, KMX-8483

PART 3 : CRYSTAL SCANNERS

BEFORE the days of crystal scanners, users wishing to pick up more than one radio service would have to stack one tuneable receiver on top of another. This became quite a nuisance when eight or ten channels might wish to be listened to in a newsroom at a local radio station.

Approximately eight years ago, the crystal scanner was introduced into the radio world. Pioneering the scanner market was an eight channel scanner capable of picking up one band, either the low band or high band. Later on that following year, a single band UHF scanner was introduced.

As more and more radio services began to escalate up in different frequencies and different bands, there grew a need for a receiver capable of picking up two bands, hence developed the dual band scanner. And, as you can guess, finally the triband scanner was introduced, picking up the low band, high band and UHF band all within a single cabinet. The triband scanner truly revolutionized the art of receiving any public safety service, regardless of which band they operated on!

In order for you to select the proper scanner, you first need to know what services are on the air and on which bands they operate. Chances are, you'll find the triband scanner may be the best way to go in your area of reception. Or, if it isn't, it probably soon will be as more and more police and fire departments forsake the low and high bands, and go to the clear transmission and reception characteristics of the UHF band.

Scanners come in many shapes, many sizes, and with many price tags. The old rule generally holds true when it comes to scanners—the more expensive, the better they operate. That does not mean you aren't going to get a good scanner when you buy one at a low price, but you may find that the more expensive scanner will give you easier listening when operated in urban cities or highly congested radio areas. Less

expensive scanners tend to have less circuitry, which will allow off-frequency stations to creep in and "muddle up" usually clear reception as found in more expensive scanners.

The pocket scanner is truly an amazing and versatile radio receiver—usually covering four or six channels in its tiny portable cabinet. These pocket scanners are generally light weight, and operate off of self-contained penlight batteries. These batteries may be substituted for rechargeable Nicad batteries in most pocket scanners.

The controls on a pocket scanner will first consist of the volume and squelch—usually just enough volume to be heard when worn on the belt—and more than adequate volume when held up near the ear. Along with these controls are the readouts—usually light emitting diodes for minimum current consumption. These will flash in accordance with which channel the unit is momentarily listening to, or will stop on a channel when a signal is present. The more sophisticated pocket scanners will also have a lock out switch so you may bypass any channel that might ordinarily lock up the receiver—such as the continuously operating United States Weather Service broadcasts on 162.55 MHz.

Another control that pocket scanners may have is the scan/manual switch that allows you to either scan all the channels automatically, or allow you to individually select any channel you wish to listen to. Finally, a telescopic or rubber antenna comes out the top of the unit and when fully extended will permit you receiving semidistant stations. Because these antennas are not quite as long or as well matched as mobile or bay station antennas, they do not have quite the capability of picking up every single station that you might hear on a larger antenna—but nonetheless, they work out darn well!

Mobile scanner receivers are probably one of the most commonly found—either in the home or in the car. Yes,

I did say mobile, but most mobile scanners have built-in AC supplies for being operated on house power.

The face of the mobile scanner will feature anywhere from one, four, eight, ten, or sometimes twenty individual channel and individual channel indicator lights. Sometimes these flashing lights are replaced with light emitting diodes—not quite as bright, but they do give a precise indication as to which channel is being scanned.

Because these units have more room for more controls, each channel will probably have an individual lock out switch. The purpose of the switch is to, when depressed, lock out that channel when you do not wish to have it in the scanning sequence. Again, the United States Weather Service would probably be a channel that you would lock out until you would have a time that you may wish to monitor it. Lock out switches are handy when going from one area to another to concentrate your listening only to the area you are in.

The more sophisticated mobile scanners may have a priority switch which allows the unit to sample a predetermined channel for incoming calls. There are several variations to this priority switch, but they all basically operate with one premise in mind—when something comes on that priority channel, no matter what else is happening to any of the other channels, it will automatically revert back and listen to the incoming call.

A priority channel would be extremely useful for those scanner enthusiasts that might also be a member of a local fire department or ambulance squad. Although the scanner might be listening to a general police broadcast, as soon as the fire call or emergency call goes out on the priority channel, the scanner will automatically pick up that call and by "priority" bring it to the loud speaker, bypassing that channel which was previously in use. Be careful when you select a unit with priority channel—some are a true priority,

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whereas others only sample the channel as they are sampling other channels. A true priority scanner will actually have two receivers within one.

The scan/manual buttons will allow you to either step the scanner from channel to channel, or when the scan button is pushed in, allow the scanner to automatically scan until it picks up an incoming signal.

A scan rate control is another useful item in considering a crystal scanner. In certain applications, you may wish the scanner to slowly sample each channel in its scanning progression. In other applications, where you don't want to miss a single word of any transmission, you'll want the scanner to rapidly sample each channel for activity. Technically it has been found that the faster you scan, the greater the chances of missing extremely weak signals. This is why you would want to scan slowly if you are in an extremely weak reception area.

If you plan to operate the unit at home, make sure that mobile scanner does include an AC supply. Some of the more deluxe mobile scanners also may be converted into a special cabinet of wood grain finish that greatly adds to the decor of your home radio shack. All scanners have means for operating either on their own antennas—a com-

promise—or operating with efficient outside antennas. More about scanner antennas in an upcoming article.

Another handy item on a scanner to look for is an earphone or speaker jack. In noisy areas of operation, the earphone may be necessary for a pocket scanner. In a home where you want rich fidelity, an external speaker will greatly enhance the highs and lows of your scanner receiver.

How many channels to choose when looking for a scanner? That's a good question! Most enthusiasts find that they actively scan only about six or eight channels. However, it's nice to have additional channels at your command at the flick of a lockout switch. This is why we have seen some new scanners on the market with up to twenty channel capability—in any band. Here is truly a versatile piece of equipment that will allow the user to immediately listen to any or all of its twenty channels. However, as I just mentioned, chances are the user will only be listening to six or eight channels at a time! After all, if you were to try and listen to all twenty channels, it would probably take ten minutes for the scanner to get from channel one to channel twenty!

Take a look at the specifications before selecting a scanner. Top quality scanners will have an extremely low

sensitivity figure—the lower the sensitivity figure, the better the scanner. A scanner with .5uV of sensitivity does not hear weak stations as well as a scanner with .3 uV of sensitivity. A scanner with .2uV of sensitivity is deemed an extremely sensitive one.

But just as important as sensitivity is the ability of a scanner to reject off station channels—and this is called selectivity. The higher the selectivity figure, the better the receiver. A scanner with 50dd selectivity will not reject off station frequencies as well as a scanner with 70dd selectivity. A good scanner will generally yield better than 60dd selectivity.

“But I keep hearing the local telephone channel coming over on my police frequencies.” This is a common problem—intermodulation. Because scanners do not have the same circuitry as the more expensive land mobile transceivers, users may encounter from time to time either severe or mild cases of intermod. There's not much that can be done when this condition persists, other than to change locations of the scanner's antenna. And I don't mean just across the room—but you might have to find a new place to live if your scanner continuously picks up intermodulation. Take a look, though, and if you are using an inexpensive scanner, chances are a more expensive scanner will help alleviate this problem.

Some scanner manufacturers have modification kits that will help clean up this problem—contact your local scanner store for more details on this.

Probably one of the best ways to select a scanner by its features is to hear one in operation. Leading scanner outlets will have the majority of their scanners for sale hooked up to antennas and capable of receiving radio calls with appropriate crystals installed. Talk over your scanner requirements with your local scanner dealer, and chances are he will assist you in making up your mind when attempting to select the best scanner for your reception requirements. It's best to actually listen to a scanner and hear the difference between an inexpensive one and a more expensive one—and believe me, you can usually hear the difference!

When selecting a crystal scanner, insure that the crystals are readily available from this scanner outlet. It's no fun purchasing a scanner today, only to have to wait a month or two for the crystals to arrive for the specific channel you wish to monitor. Leading scanner outlets carry a wide selection of crystals in stock ready for immediate insertion in the scanner receiver. Also make sure that your scanner takes common crystals—some scanners take odd ball crystals that are quite hard to find. I'm happy to report that those scanner



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manufacturers are far and inbetween, and those that have leading names in the scanning industry take two common types of crystals—just two common types!

Have your dealer show you how to install the crystals, and make sure that after you purchase the scanner and the crystals he installs the crystals right there at the shop so there's no question that each and every channel is operational. Crystals have been known to fail upon arrival, and you'll need to insure that they are "active" when you buy the receiver. Only the finest of scanner receivers—the most expensive—have crystal "trimmers" for netting the crystal precisely on frequency. These crystal "trimmers" are extremely useful on the UHF band where crystal tolerances are critical. Don't worry if you don't see the "trimmers"—they're only found on the most expensive pieces of scanning equipment. But, may I caution that you use only those crystals as recommended by the manufacturer—cheap crystals, especially for UHF reception, will lead to off channel reception and no end to lousy monitoring capabilities.

A scanner that takes no crystals? How in the world can they do that? We'll explore that next month when we look into a new breed of scanners—the programmable scanner.



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Nuts and Bolts Dictionary

By Harold Perry

Even an excellent magazine like CB Radio/S9 can make a mistake and to prove it, here is the second installment of the "Nuts and Bolts Dictionary." Last month, NBD did not appear due to the fact that it was confiscated by the C.I.A. (Citizens Intellect Association.)

MONSTER LANE



That's the inside lane of a highway. You know, the lane that those idiots shoot out onto without looking.

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That's radio control signals. You may not have had a rig in that old souped up chrome buggy, but, I bet you did some bodacious modulating in it.

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Q. With so many brands from which to choose, how can you know you are making a wise decision?

A. The best course is to ask the advice of knowledgeable CBers — your personal “survey” will be well worth the effort.

Q. Where should I go to purchase a CB radio?

A. The CB specialty store is built on electronics know-how and able to give sound advice, installation, service and a wide selection of antennas and accessories.

Browning may not be your first set, but — when you do get serious about CB and begin to discover Browning's superior performance ... you'll begin to understand why CBers have relied upon the name Browning since Citizens Band began almost two decades ago.

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"THE F.C.C. IS ON THE AIR—



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SELECTED INTERVIEW BY GORDON WEST

Years ago we always used to hear the story about a CB'er linking up with an F.C.C. man on the air—but it always turned out that the CB'er was simply "spinning another yarn", because everybody knew that the F.C.C. had really no time at all to racket-jaw with CB'ers on the air.

In the first time of Citizens Band history, the Federal Communications Commission is going on the air, and they might just be talking with *you* next week! In a brand new public education campaign, the F.C.C. has decided to go on the air and talk directly to those CB'ers that are violating the rules and regulations. This "on the air" program was really the brainchild of Jerry Freman, the Federal Communications Engineer in charge of the Enforcement Division in Norfolk, Virginia. Although this "on the air" program is in its infancy in the Virginia area, it will probably soon spread throughout the country—it's been a tremendous success in its first few weeks—and Jerry feels that other Field Operations Bureaus of the F.C.C. will soon start their program in their area.

At a recent seminar that Jerry and I were speaking at, I was able to interview him and find out exactly how the new "on the air" program is going, and what reaction CB'ers had to talking face-to-face—or should I say microphone-to-microphone—to an F.C.C. Engineer on the air!

"Jerry, since you're now on the air, what is your call sign?"

"We were issued the call sign KFCC-1000. It's a distinctive call sign, and only authorized F.C.C. stations across the country may use these four letters and a block of four numbers that follows the letters."

"I imagine that when you contact a CB'er on the air operating illegal, he's quite surprised! What is their initial reaction when you give them a call, Jerry?"

"Most of the time, Gordon, they know we are in the

area and are going to be on the air. We have started this program by pre-announcing our "on the air" program—usually coinciding with a weekend that there is a large CB Jamboree in our immediate area of operation. The word spreads quite quickly—they know we'll probably be on the air at the Jamboree!"

"Do you always announce that you are going to be on the air, Jerry, at a specific time, or at a certain function?"

"No, sometimes we simply go on the air at random times and on various CB 23-channels, and talk directly to those operators using those channels without their call signs."

"Are they surprised to hear that it's really the F.C.C. calling them?"

"Absolutely so! But, they never seem to really doubt that it is us—simply by our distinctive call sign, and possibly the authority with which we ask them to please use their assigned call letters. Sometimes we might have a few operators in a city that might truly doubt that it is us, and they call our main office to see if we're really on the level. Once they find out that we are, word spreads quick!"

"Who are the CB'ers that you are really going out after, and contacting on the air, trying to get them to operate legally?"

"The majority is going after the willful violators—those that are using excess power, operating on unauthorized frequencies, talking to stations more than 150 miles away. You know, Gordon, things like that."

"Are you then tracking down these violators that you talk to and issuing them citations on the spot?"

"No, we are not. This "on the air" program is purely an intensive education program—not so much for finding violators and fining them, but rather talking to them directly and encouraging them to operate by the

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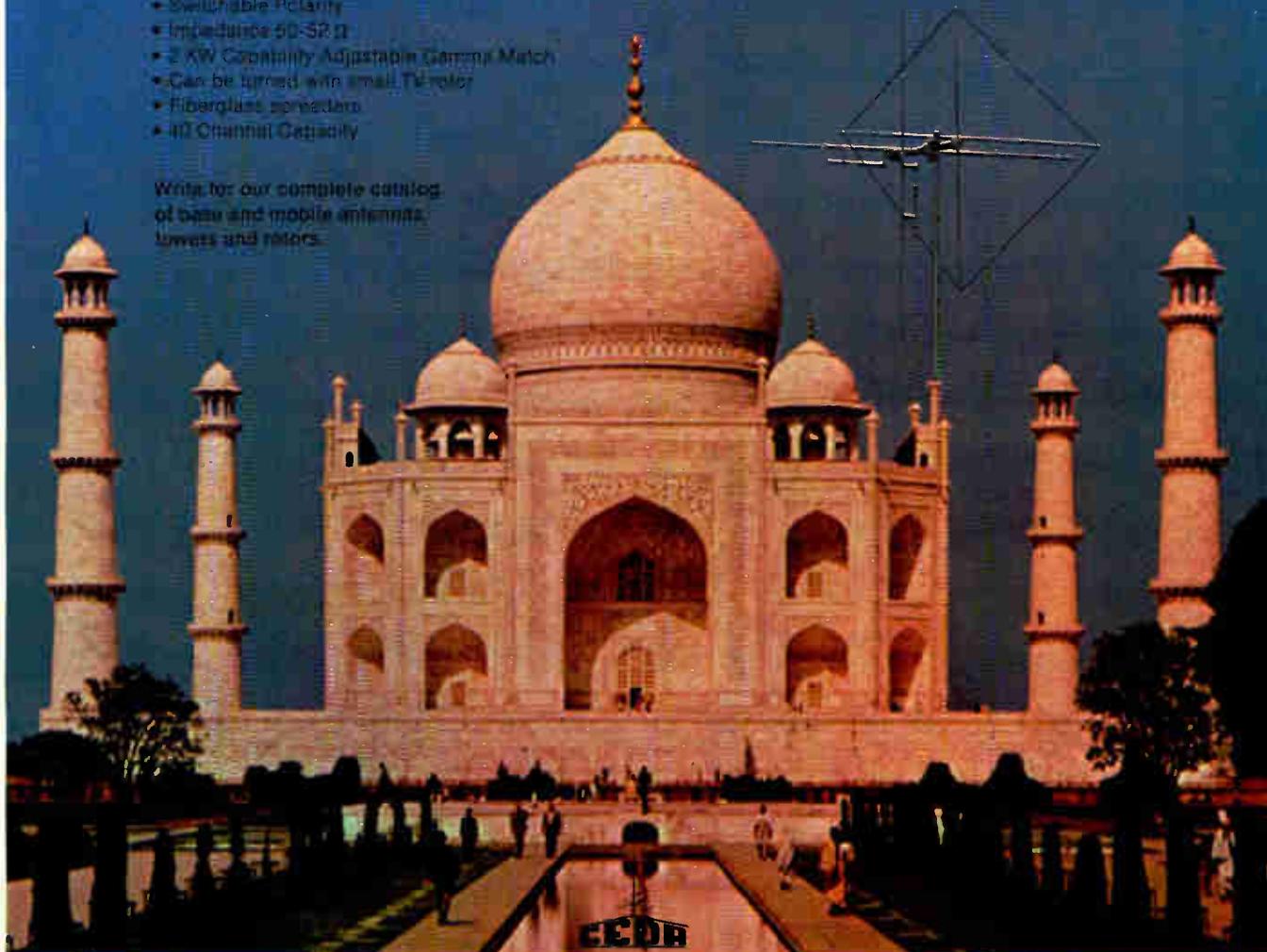
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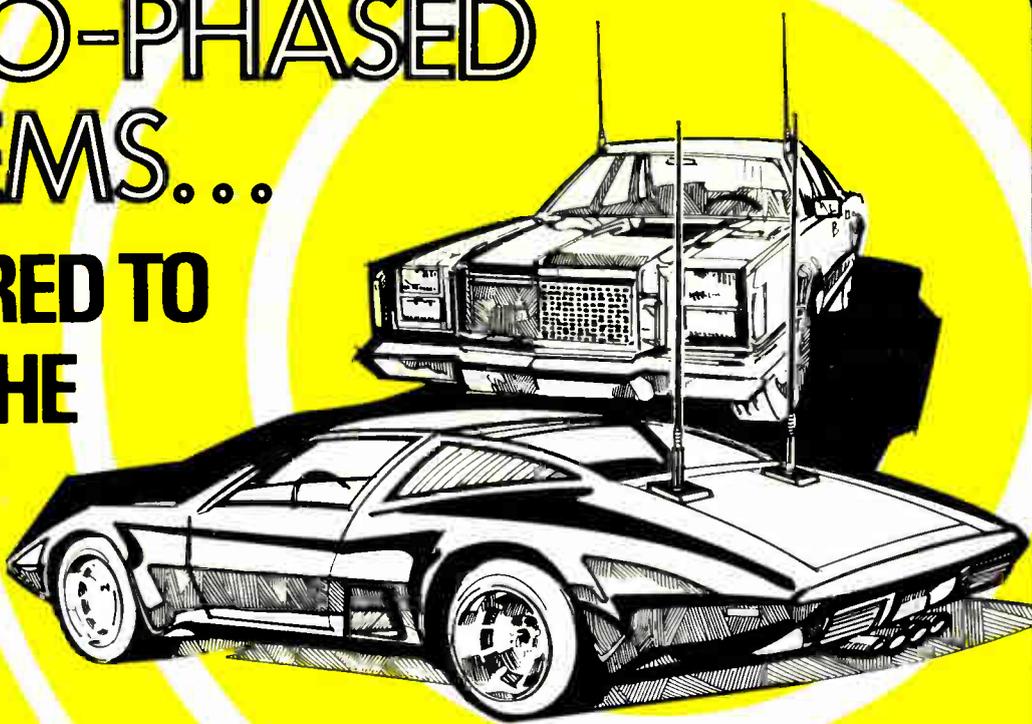
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GC ELECTRONICS

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rules and regulations of the Citizens Band. This whole program is an educational one—and it seems to be working out quite well.

“Jerry, after you have been talking to a few CB’ers operating illegally on a certain channel, what is that channel like, let’s say, after an hour or so?”

“We find that after we have been on the air, and the word has gotten out that we are on the air on those 23-channels, almost every channel has users that are immediately identifying their station and complying strictly by the rules—they sound like model Citizens Band operators! This points out the success of the program! In fact, many times we hear CB’ers calling us back on the air who wish to ask us questions they have regarding certain rules that they may not be familiar with. In fact, many times we are invited to make an impromptu visit at an evening coffee break and talk to a local gathering of CB’ers—the program is well accepted, Gordon.”

“What else do these CB’ers say when you give them that first call when you find them operating illegally?”

“Sometimes they say that they wish to comply with the rules after talking with me, but still don’t want to give their call letters because they think we are going to get them and issue them a citation. We try and convince them that we will not, but they’re still hesitant—possibly thinking that we may have heard them on those elusive high frequencies and will still recognize their voice!”

“What do you tell them then?”

“We simply say forget about it—just start using your call letters and we won’t take any further action. They generally do.”

“What happens if those people you talk to admit they don’t have a license?”

“About 50% say that they are still awaiting their call letters—long before the point of purchase licensing took effect—and we simply tell them to go down and fill out a temporary license so they can come back on the air legally.”

“Jerry, what type of radio does the F.C.C. use to contact fellow CB’ers? Do you use high-power? Do you use some type of transceiver that only F.C.C. officials use?”

“Because we are operating as a government station, we are not compelled to use the same type of equipment or power levels that all CB’ers must use—however, we use a stock transceiver—I won’t mention the name—and we do operate the legal limit of four watts output. In fact, Gordon, when we first began this program, we didn’t use any call signs at all—simply stating that we were the F.C.C. We received such a hassle from CB’ers—you know, they said ‘Hey Uncle Charlie, how come you don’t use call signs when we have to’—that we finally convinced Washington that we needed our own special call letters!”

“What call letters might an F.C.C. man use now on CB in other parts of the country?”

“Washington has issued us a bank of call letters beginning at KFCC-0000 all the way to KFCC-10,000.”

“Do you often speak with stations that you feel are using excessive power or over-modulation?”

“Well, we operate from the offices and we actually measure the frequencies and the modulation. We tell people to turn their power mikes down to their proper level if we think they are using excessive power, we ask them to see a technician.”

“What about those operators that talk over-time?”

“If someone is on a channel and not waiting their one minute between, after speaking for five, we tell them. We say ‘Look, you’re really infringing on your neighbors, knock it off. They say, ‘Supposing I’m on my 60 second silent period, can I acknowledge a call?’ And we tell them ‘yes you can’. It’s a give and take on it and I think it’s an explanation and it may be the answer to getting some orderly use of the service and make it more effective.”

“Back to that over-power question—we must realize that there are a lot of CB’ers out there using excessive power, Jerry, how are you able to tell that you are communicating with a station running over-power?”

“Our engineers using the mobile units can really, experienced engineers can tell whether someone’s using excess power based on the distance from the subject’s home, the readings he’s getting on his sophisticated direction finding equipment. He can pretty much guesstimate if a guy is using excess power, yes.”

“Jerry, what amusing incidents have occurred on the air when you are communicating with CB’ers operating illegally?”

“One time someone broke, I guess they weren’t listening too long and they said ‘Hey, I hear you’re Uncle Charlie’, and I said ‘Yeah, that’s what they call me.’ He said ‘You can’t use that call sign’ and I said ‘why not?’ He said ‘The F.C.C.’s going to get mad at you.’ Evidently, he didn’t realize that I was the real one!”

“So what did you tell him?”

“I told him, I was the man. Then I didn’t hear any more from that station at all—not even a sign off with his call letters!”

“Jerry, what would you say is the main intent for the F.C.C. operating on the air?”

“What we want to tell them is, we’re not interested in the content of the communication, we really aren’t. We’re interested in just the fact that they try to abide by the regulations. He will not get a fine for accidentally violating the regulations. The only way you can get a fine or be prosecuted is for willfully violating the law and you know, you notice it. The guy will have a slider on his transmitter and will use a variable frequency oscillator or he may operate on 27450 MHz and

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he'll use some kind of nick-name and then he says 'O.K., I'm going back down and he gets down on Channel 16 on Single Sideband and he uses his call letters. Now, that is a willful violation right there when he gets down, and those fellows are fair game.'

"Fair game meaning what, Jerry?"

"We will take action against them. We are concentrating on those violators that are willful operating illegal procedures—not accidental ones. That's what we want to discuss with these folks on the air."

"Jerry, what success have you had in your own Norfolk, Virginia area?"

"I would say that it's extremely successful because 95% to 98% of the people in the Norfolk area are using their call signs, and were meeting with presidents of the various clubs and encouraging self-regulation—we don't want any vigilante type things—and frankly, the regulations require that you shall not speak to unlicensed stations and we're asking CB radio operators to refrain from speaking to someone who doesn't use their call letters."

"Anything else, Jerry?"

"Yes, Gordon, the big thing is—IT'S WORKING! People are listening to what we say, on the air, and they are now abiding by the rules more than they did before. The program is working!"

"As you can see, the F.C.C. has brought on the air a new program that is going to greatly influence the operating techniques of a lot of CB'ers. Since they are a governmental station, and not necessarily bound by CB rules, don't be surprised to hear them operating on frequencies either below or above the present 40-channels. Yes, they do have some sophisticated Single Sideband equipment, and it wouldn't be too strange to hear them operating and speaking to those operators presently above channel 40."

"The F.C.C. is out on an intensive educational program—out there, on the air, trying to talk to as many illegal CB'ers as possible. Be careful—if your operating techniques do not include call letters and illegal procedures, the very next station you might work could be K-F-C-C-1-0-0-0."

WANTED

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2SC502	3.79	2SC775	2.75	2SC1017	1.50	2SC1679	4.75	SK3046	2.15
2SC517	4.75	2SC776	3.00	2SC1018	1.50	2SC1728	2.15	SK3047	3.75
2SC614	3.80	2SC777	4.75	2SC1173	1.25	2SC1760	2.15	SK2095	3.50
2SC815	3.90	2SC778	3.25	2SC1226A	1.25	2SC1816	5.50	SK3048	3.25
2SC616	4.15	2SC797	2.50	2SC1237	4.50	2SC1908	.70	SK3054	1.25
2SC617	4.25	2SC798	3.10	2SC1239	3.50	2SC1957	1.50		
2SC699	4.75	2SC781	3.00	2SC1243	1.50	2SF8	3.00	2SK19	1.75
2SC710	.70	2SC789	1.00	2SC1306	4.75	HEP-S 3001	3.25	2SK30	1.00
2SC711	.70	2SC796	3.15	2SC1306-1	4.90	2SD235	1.00	2SK33	1.20
2SC735	.70	2SC799	4.25	2SC1307	5.75	MRF8004	3.00		
2SC756	3.00	2SC802	3.75	2SC1307-1	6.00	4004	3.00	3SK40	2.75
2SC765	9.50	2SC803	4.00	2SC1377	5.50	4005	3.00	3SK45	2.75
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2SA316	.75	2SB235	1.75	2SC460	.70	2SC828	.75	2SC1756	1.25
2SA473	.75	2SB303	.65	2SC478	.80	2SC829	.75		
2SA483	1.95	2SB324	1.00	2SC491	2.50	2SC830	1.60	2SD30	.95
2SA489	.80	2SB337	2.10	2SC497	1.60	2SC839	.85	2SD45	2.00
2SA490	.70	2SB367	1.60	2SC515	.80	2SC945	.65	2SD65	.75
2SA505	.70	2SB370	.65	2SC535	.75	2SC1010	.80	2SD68	.90
2SA564	.50	2SB405	.85	2SC536	.65	2SC1012	.80	2SD72	1.00
2SA628	.65	2SB407	1.65	2SC537	.70	2SC1051	2.50	2SD88	1.50
2SA643	.85	2SB415	.85	2SC563	2.50	2SC1061	1.65	2SD151	2.25
2SA647	2.75	2SB461	1.25	2SC605	1.00	2SC1079	3.75	2SD170	2.00
2SA673	.85	2SB463	1.65	2SC620	.80	2SC1096	1.20	2SD180	2.75
2SA679	3.75	2SB471	1.75	2SC627	1.75	2SC1098	1.15	2SD201	1.95
2SA682	.85	2SB474	1.50	2SC642	3.50	2SC1115	2.75	2SD218	4.75
2SA699	1.30	2SB476	1.25	2SC643	3.75	2SC1166	.70	2SD300	2.50
2SA699A	1.75	2SB481	2.10	2SC644	.70	2SC1170	4.00	2SD313	1.10
2SA705	.55	2SB492	1.25	2SC681	2.50	2SC1172B	4.25	2SD315	.75
2SA815	.85	2SB495	.95	2SC684	2.10	2SC1209	.55	2SD318	.95
2SA816	.85	2SB507	.90	2SC687	2.50	2SC1213	.75	2SD341	.95
		2SB511	.70	2SC696	2.35	2SC1226	1.25	2SD350	3.25
2SB22	.65			2SC712	.70	2SC1243	1.50	2SD352	.80
2SB54	.70	2SC206	1.00	2SC713	.70	2SC1293	.85	2SD380	5.70
2SB56	.70	2SC240	1.10	2SC732	.70	2SC1308	4.75	2SD389	.90
2SB77	.70	2SC261	.65	2SC733	.70	2SC1347	.80	2SD-390	.75
2SB128	2.25	2SC291	.65	2SC739	.70	2SC1383	.75	2SD437	5.50
2SB135	.95	2SC320	2.00	2SC715	1.75	2SC1409	1.25	MPS-U31	at 4.00 ea.
2SB152	4.50	2SC352	.75	2SC762	1.90	2SC1410	1.25	MPS 8000	at 1.25 ea.
2SB173	.55	2SC353	.75	2SC783	1.00	2SC1447	1.25		
2SB175	.55	2SC371	.70	2SC784	.70	2SC1448	1.25		
2SB178	1.00	2SC372	.70	2SC785	1.00	2SC1507	1.25		
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1N914	.10	2N962	.40	2N2221	.25	2N2914	1.20	2N3771	1.75	2N4402	.20
		2N967	.50	2N2221A	.30	2N2916A	3.65	2N3772	1.90	2N4403	.20
2N173	1.75	2N1136	1.35	2N2222	.25	2N3019	.50	2N3773	3.00	2N4409	.20
2N178	.90	2N1142	2.25	2N2222A	.30	2N3053	.30	2N3819	.32	2N4410	.25
2N327A	1.15	2N1302	.25	2N2270	.40	2N3054	.70	2N3823	.70	2N4416	.75
2N334	1.20	2N1305	.30	2N2322	1.00	2N3055	.75	2N3856	.20	2N4441	.85
2N336	.90	2N1377	.75	2N2323	1.00	2N3227	1.00	2N3866	.85	2N4442	.90
2N338A	1.05	2N1420	.20	2N2324	1.35	2N3247	3.40	2N3903	.20	2N4443	1.20
2N398B	.90	2N1463	.95	2N2325	2.00	2N3250	.50	2N3904	.20	2N4852	.55
2N404	.30	2N1540	.90	2N2326	2.85	2N3375	6.50	2N3905	.20	2N5061	.30
2N443	1.75	2N1543	2.70	2N2327	3.80	2N3393	.20	2N3906	.25	2N5064	.50
2N456	1.10	2N1544	.80	2N2328	4.20	2N3394	.17	2N3925	3.75	2N5130	.20
2N501A	3.00	2N1549	1.25	2N2329	4.75	2N3414	.17	2N3954	3.75	2N5133	.15
2N508A	.45	2N1551	2.50	2N2368	.25	2N3415	.18	2N3954A	3.50	2N5138	.15
2N555	.45	2N1552	3.25	2N2369	.25	2N3416	.19	2N3955	2.45	2N5198	3.75
2N652A	.85	2N1554	1.25	2N2484	.32	2N3417	.20	2N3957	1.25	2N5294	.50
2N677C	6.00	2N1557	1.15	2N2712	.18	2N3442	1.85	2N3958	1.20	2N5296	.50
2N706	.25	2N1560	2.80	2N2894	.40	2N3553	1.50	2N4037	.60	2N5306	.20
2N706B	.40	2N1605	.35	2N2903	3.30	2N3563	.20	2N4093	.85	2N5354	.20
2N711	.50	2N1613	.30	2N2904	.25	2N3565	.20	2N4124	.20	2N5369	.20
2N711B	.60	2N1711	.30	2N2904A	.30	2N3638	.20	2N4126	.20	2N5400	.40
2N718	.25	2N1907	4.10	2N2905	.25	2N3642	.20	2N4141	.20	2N5401	.50
2N720A	.30	2N2060	1.85	2N2905A	.30	2N3643	.15	2N4142	.20	2N5457	.35
2N918	.35	2N2102	.40	2N2906	.25	2N3645	.15	2N4143	.20	2N5458	.30
2N930	.25	2N2218A	.30	2N2907	.25	2N3646	.14	2N4220A	.45	C103y	.25
2N956	.30	2N2219	.25	2N2907A	.30	2N3730	1.50	2N4234	.95	C103d	.40
						2N3731	2.75	2N4400	.20	C106b1	.50
										C106d1	.75

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Bill Orr on Antennas

PART 12: GAINING ON GAIN

LET'S talk about *gain antennas* now. There's a lot of information, some good some bad, floating around about gain antennas. And some of the stories you hear are true. A lot of hokus-pokus surrounds gain antennas and it is easy to be confused by claims and counter-claims of over-eager advertisers touting their wares to a gullible public. So, with these words of warning, let us proceed.

Antenna Power Gain

Power gain (or signal gain) is a term used to express the power increase in receiving or transmitting of one antenna as compared to a standard reference antenna. The reference antenna used in the industry may be either a *dipole antenna*, or it may be an imaginary device called an *isotropic antenna*, useful for mathematical computations in the laboratory. The isotropic antenna is considered to be so small that it radiates equally well in all directions—something that no actual antenna can accomplish.

By comparing all antennas to a standard antenna it is possible to make comparisons between the various antennas and to determine a figure of merit for them, based upon the signal gain of each antenna type. *Beam antennas* have power gain and simple antennas (such as a mobile whip antenna) do not.

The Beam Antenna

A beam antenna, as the name implies, is an antenna that concentrates radio energy in one direction at the expense of radiation in other directions. The searchlight analogy is a good one as it concentrates light in the same manner that a beam antenna concentrates radio waves. Beam antennas come in all shapes and sizes and prove to be a willing subject for imaginative manufacturers to exploit, sometimes at the expense of the buyer, who can be dazzled by important sounding words and inflated claims. But before we go into beam antennas, it is well to pause and quickly examine the "yardstick" by which antennas of all kinds are measured, so far as gain is concerned. This "yardstick", when properly interpreted, can tell you a lot about any antenna. The "yardstick" is called the *decibel*.

The decibel was discussed in a previous column

(August, S-9) and the reader is referred to that issue for background information on this interesting unit of measurement, named in honor of Alexander Graham Bell, the inventor of the telephone. A summary of the decibel, referenced to real power gain, is shown in Figure 1.

The decibel is not a unit of power, but a *ratio of power levels* and in antenna work, the decibel is used as an absolute unit by fixing the level of reference, as discussed previously. Thus the decibel can express power gain of any antenna as referenced to either a dipole or an isotropic antenna. Antenna gain expressed in decibels without mention of reference level is meaningless. It is often deliberately expressed in this fashion by some antenna manufacturers who hope to overawe the reader into thinking he is getting more power gain for his money than he actually is. For example, the statement, "Ten decibels power gain!!!" doesn't mean a thing, because it doesn't refer the gain figure to any level of measurement. (It may mean 10 decibels power gain over a wet noodle). If the statement said, "Ten

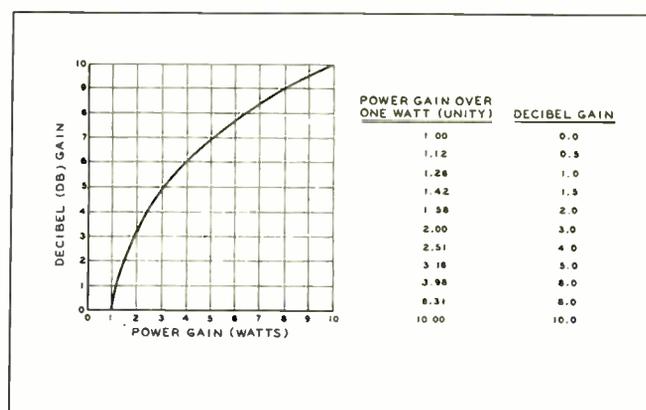


Fig. 1—The mysterious decibel—the "yardstick" of antenna performance. The decibel is the yardstick of performance in the antenna world, just as horsepower is the yardstick in the automotive world. This chart shows the relationship between the decibel and the watt for power gains of up to 10 over a reference level of one watt. For example, a power increase of 6.31 represents a decibel gain of 8. A decibel gain of 3, on the other hand, represents a power gain of 2. Antenna gain is expressed in decibels gain over a reference antenna, such as a dipole or isotropic radiator, as explained in the text. (Drawing courtesy of Radio Publications, Inc.)

decibels power gain over a reference dipole”, the statement has meaning, as the level of reference is given.

Power gain referenced to a dipole is abbreviated (dBd) and power gain referenced to an isotropic radiator is abbreviated (dBi).

I hate to hash all of this over again for fear of boring you, gentle reader, but you must get the idea of the decibel through your noggin before you can discuss gain antennas intelligently. OK? Enough said on that subject.

Vertical Gain Antennas

The most popular vertical antenna for CB service is the simple ground plane antenna (Figure 2). Using the isotropic radiator as a reference, the ground plane has a power gain of about 0.3 decibel. The ground plane radiates its energy in all directions and is called an *omnidirectional* antenna. It also radiates a lot of energy high in the air, which serves no useful purpose unless you are in conversation with an airplane. Because most CB communication is along the level of the ground, a modified ground plane antenna was devised that squeezes the energy radiation closer to the ground (at the expense of airplanes flying overhead; Figure 2B). This gain antenna is referred to as a “five-eighths wavelength” antenna. It is about 21 feet tall and resembles a tall ground plane, except for the fact that it has some kind of tuning unit or matching device at the base, which is not needed with the simple ground plane.

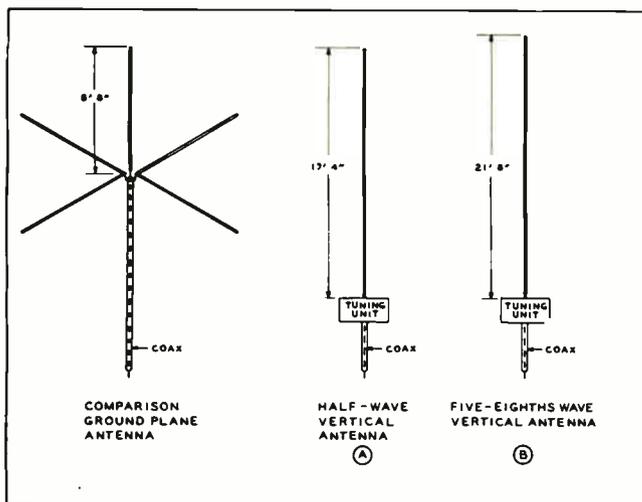


Fig. 2—Vertical gain antennas provide boost in “talk power” over the popular ground plane antenna. The half-wavelength vertical (A) provides a modest power gain of 1.8 decibel over a ground plane. The five-eighths-wavelength vertical (B) provides about 3 decibels power gain over a ground plane. This is a worthwhile increase in signal and an antenna of this type is recommended for general coverage work. (Drawing courtesy Radio Publications, Inc.)

The gain of a $\frac{5}{8}$ -wavelength vertical antenna is 3 decibels over a ground plane antenna. This is equivalent to doubling your transmitter power output and is worthwhile, as it can make a considerable difference over a tough communication circuit. And don't forget that the gain is available for reception, too!

... Use S9 READER SERVICE.

Some manufacturers offer a half-wavelength vertical antenna which, in my opinion, is neither fish nor fowl. It is about 17 feet tall and provides a power gain of about 1.8 decibels over a ground plane. Better than nothing, but not much!

The Beam Antenna

The vertical gain antennas just discussed are really not beam antennas, as they have a omnidirectional pattern, and achieve gain only by “squeezing” the radiation closer to the horizon. A beam antenna, in the true sense of the word, provides a *beam* of energy in a single direction. The most popular style of beam antenna is the Yagi, or *parasitic beam* (Figure 3), named after Dr. Hidetsugu Yagi of Tokyo University, Japan. Dr. Yagi built and tested the first simple, high gain antennas named after him in 1926 and antennas of this type were popularized by radio hams just before World War II. They were extensively used for radar antennas during the war and are now used for high frequency work where low cost and high gain per unit of size are demanded.

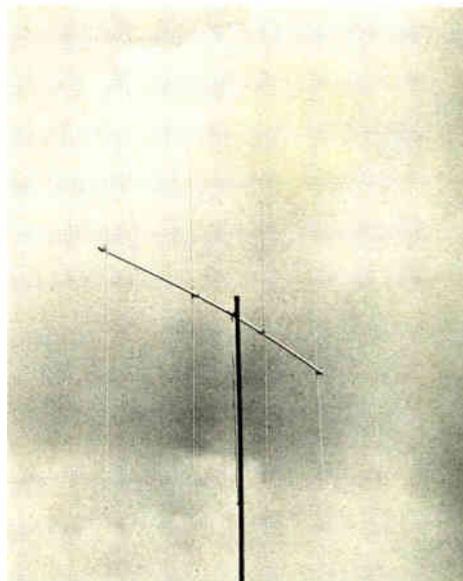


Fig. 3—The Yagi antenna for CB operation. This four element Yagi is made up of a driven element (to which the coaxial line is attached), a reflector and two directors. The four element Yagi is simple, inexpensive, easy to assemble and provides a power gain of about 11 decibels over a ground plane antenna. This gain can make a poor communication circuit into a good one. (Photo courtesy of The Shakespear Co., Antenna Group).

Most CB Yagi antennas are mounted in the vertical plane so that their transmissions are compatible with the vertical whip type antenna used for mobile operation. The Yagi is made of a *driven dipole* (half-wavelength) element and one or more parasitic elements in the same plane which may function as a reflector or director. Generally speaking, the greater the number of parasitic elements, the greater the power gain of the Yagi antenna. As the gain increases, the sharpness of the beam increases, as shown in Figure 4.

(continued)

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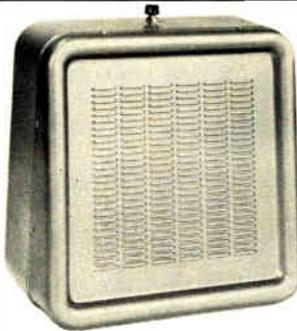
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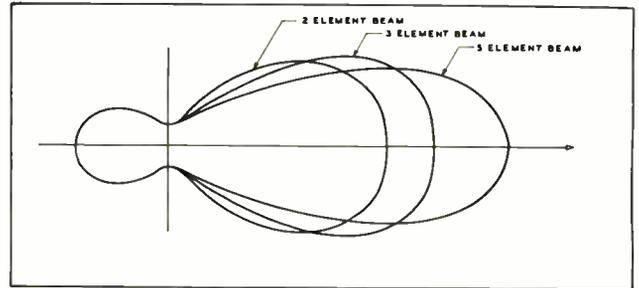


Fig. 4—Polar plot of antenna radiation as seen from above. Beam is aimed to the right. Rear, unwanted lobe of beam falls to the left. The main lobe of radiation is proportional to the power gain of the antenna. As parasitic elements are added, the beam pattern becomes stronger and narrower. (Drawing courtesy of Radio Publications, Inc.)

The Yagi Beam for CB Radio

Yagi CB antennas are usually constructed of aluminum tubing and the dipole and parasitic elements are about a half-wavelength long, or approximately 18 feet. Proper antenna operation depends not only upon element length, but also upon the spacing between the elements, which usually runs from 5 to 7 feet for the CB channels. Three, four and five element Yagi beams are common in CB service (Figure 5). The three element Yagi has a power gain of nearly 10 decibels over a ground plane antenna. This corresponds to a power gain of 10, making a 5 watt CB station legally equivalent in power to a 50 watt station using a quarter-wave ground plane antenna!

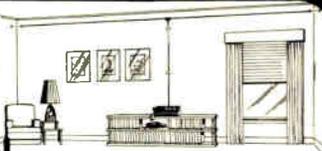
Adding extra elements to the Yagi boosts the overall gain figure by about one decibel per extra element. This is no big deal, and a five element Yagi will only be marginally better than a three element Yagi. But if you are going *Whole Hog* and erect a five element beam, the difference between it and a simple ground plane is an awesome 12 decibels. This will turn a difficult communication circuit into a reliable one.

This addition of gain with extra elements is not infinite, however, and after five or six elements have been added, tuning of the Yagi beam becomes rather sticky—adjustment is difficult—and such giant antennas are not very practical, except at very high frequencies where the antenna is quite small and laboratory adjustments may be made easily.

The All-Metal Yagi Antenna

Most CB Yagi antennas are of all-metal construction, including the supporting structure called a *boom*. The various parasitic elements (directors and reflectors) are commonly mounted directly to the boom at their center point as the radio energy does not flow from the element into the boom. The dipole, or driven element, is attached to the coaxial line at the center and the element may be insulated from the boom at this point. Some Yagis are designed so that the dipole element is mounted to the boom with no insulation, simplifying

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the mechanical assembly, but requiring the addition of an adjustable matching device placed at the antenna.

There's no reason why a Yagi beam could not be made of wire instead of tubing. But it would be a cumbersome assembly to build and it would be even harder to rotate it. Some radio hams use fixed Yagi beams, slung between trees, that are made of wire, and are aimed in one particular direction, but most of the ham beams are made of light weight aluminum, and often by the same manufacturers that build CB antennas, for that matter!

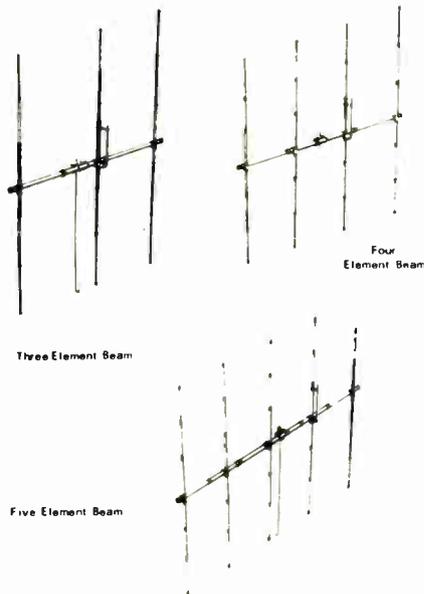


Fig. 5—THE YAGI BEAM ANTENNA is composed of a dipole driven element and a number of parasitic elements. Shown here are 3, 4 and 5 element Yagi beams, mounted in a vertical position on a supporting mast. The beam patterns are directed to the left. The driven element of each beam is characterized by the matching transformer, seen as a short section of vertical tubing attached to the dipole just above the center. Elements to the left of the dipole are directors and the element to the right of the dipole is the reflector.

Most Yagi beams are made of light weight aluminum tubing. The tubing is cut into short sections for ease of shipment and the sections telescope together and are locked in position by means of clamps or sheet metal screws. (Drawing courtesy of Radio Publications, Inc.).

The Cross-Polarized Yagi Beam

Two Yagi beams may be mounted on the same boom with the elements at right angle to each other, as shown in Figure 6. By proper switching, the array may use one Yagi for vertical polarization, or the other Yagi for horizontal polarization. The antenna may be called a *cross-dipole beam*, *dual polarity*, *X-beam*, a *criss-cross array*, or some such fanciful name.

In most instances, separate coaxial lines are brought down from each dipole element and the operator makes the polarization choice by switching from one line to another. As only one beam is used at a time, the power gain of such an array is equal to the gain of a single beam, since you can't count the same gain twice.

Some cross-polarized Yagi arrays are provided with a matching harness of special coax line placed directly at the antennas, with only a single coaxial line running down to the equipment. In effect, both beams are operating simultaneously. In this instance, the power

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Cary Cowan	Green Dragon Sleeping Beauty	12, 17, 19
Marc Gilman	Deacon CLI34, KW339 SSB30	12 16L
Gordon West	California Dreamer	9, 16L
Gary Deckelnick	Baby Bull	7, 19
Bill Sanders	SSB295, CLI1849 KW5304	16L, 18U
Hal Keith	Flasher	12
Pat Hartman	Six Pack	4
S9 Office Station	Deadline Base KW4405 SSB250	8 16L, 18U

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delivered to the array from the transmitter is divided equally between the beams, each beam receiving half the power. In each polarization, therefore, power is down 50 percent, or 3 decibels, as compared to feeding each beam separately. However, since both polarizations are used simultaneously, it is possible that this difference is not noticed because of random reflection and refraction of the radio wave as it travels from transmitter to receiver.

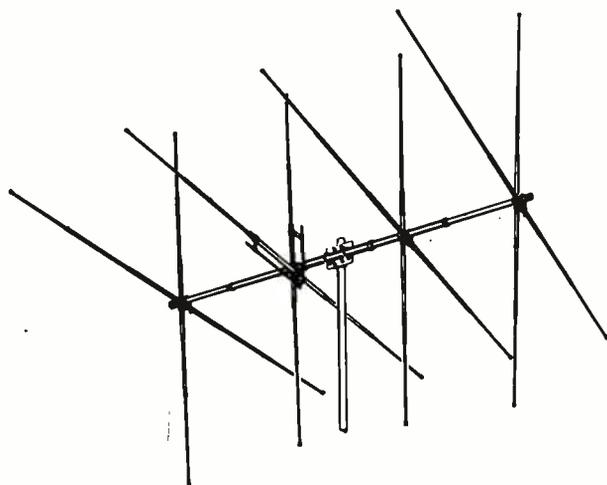


Fig. 6—THE "DOUBLE CROSS" YAGI beam antenna. Two Yagi beams mounted at right angles to each other on the same boom can be used for either vertical or horizontal polarization. Fed with two transmission lines (one to each dipole), the beam may be switched between vertical or horizontal modes by the user, by means of a coaxial switch located at the operating position. Only one beam is used at a time, and the overall gain of the array is only equal to the gain of a single beam. Switching from one polarization to the other often reduces unwanted interference and fading of the desired signal. (Drawing courtesy of Radio Publications, Inc.).

Cross-polarization can be handy to have in some cases. If two stations are using horizontal polarization, they can realize up to 20 decibels improvement over vertically polarized interfering signals on the channel. This can be a big advantage on a crucial communication circuit.

"Stacked" Yagi Beams

Two beam antennas may be placed side by side, or one over the other, to double the power obtained from a single beam. Antennas connected in this manner are said to be *stacked*, or *phased*. A stacked pair of 3-element beams is shown in Figure 7. Assuming the power gain from a single beam is 10 decibels over a ground plane antenna, the gain from two stacked beams is twice the power of one, or 13 decibels (doubling the power *adds* 3 decibels to the signal). The additional gain is achieved because the beam pattern is narrower, and less radio energy is wasted in unwanted directions.

Yagi beams can be stacked in either a vertical or horizontal position, and the stacking distance between the antennas is about a half-wavelength, or 18 feet at CB channels. To reduce cost some manufacturers drop the stacking distance to as low as 9 or 10 feet, at the expense of stacking gain. Since stacking gain is only 3

decibels (double the power), it is important that gain not be sacrificed by reducing the stacking distance.

The Yagi Wrap-Up

The Yagi beam is a compact, reliable and forgiving antenna for CB service. If you buy one that is well made, it will give you years of maintenance-free service. Your only task is to make sure that the elements do not get corroded by the passage of time and that the electrical joints in the antenna make good contact. The four element Yagi is a good compromise between antenna size, cost and results. And don't forget that it is physically balanced, with two elements on each side of the center support, and all elements are spaced clear of supporting pipe. The three element Yagi, on the other hand, has the center element uncomfortably close to the support pipe which, in some instances, can result in severe detuning of the antenna. A four element Yagi will give you greatly improved "talk power" over a ground plane antenna.

Next Month

Next month this column will discuss the *Pros* and *Cons* of the famous *Quad* beam antenna: where it came from, how it works and how it compares in performance against the Yagi beam antenna. Tune on-channel again next month!

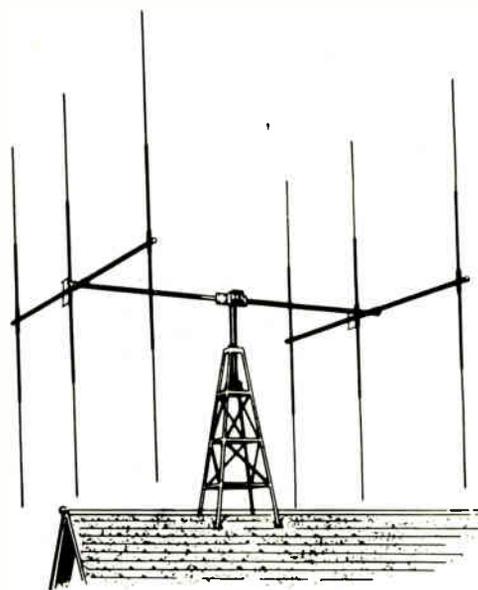
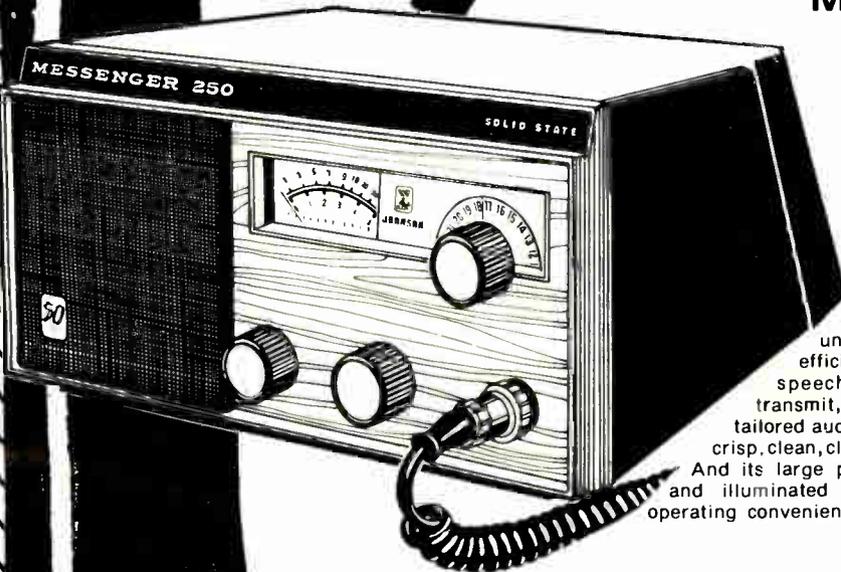


Fig. 7—A TWIN YAGI BEAM. Yagi beam antennas may be placed side by side ("stacked") to provide twice the power gain of one beam. This gives a 3 decibel boost in signal strength for both receiving and transmitting. Stacking distance should be about one-half wavelength (18 feet for the CB channels). The boost in gain is achieved by "squeezing" the beam pattern and reducing the radio energy radiated in unwanted directions. In general, the higher the gain of a single Yagi beam, the greater must be the stacking distance required to actually achieve the full theoretical stacking gain of 3 decibels. (Drawing courtesy of Radio Publications, Inc.).

(Editor's note: Bill Orr is the author of the popular Handbook, "The Truth About CB Antennas", which covers the subject from A to Z. It is available for \$5.95 plus 35¢ postage and handling from: Radio Publications, Inc., Box 149, Wilton, CT 06897).

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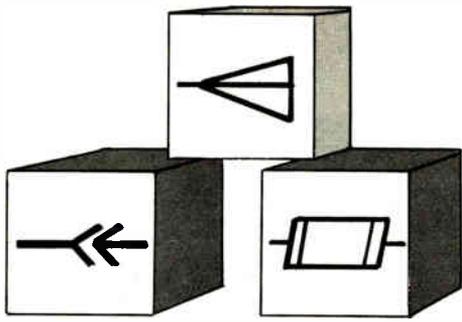
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PART 12 Voltmeters and Ohmmeters

THE voltmeter is one of the most important test instruments a technician uses. Since it is used far more frequently than the milliammeter, you should be thoroughly familiar with its operation and characteristics.

Voltmeters—The voltmeter is nothing more than a milliammeter with a resistor in series with it. The series resistor, called a *multiplier*, serves to limit the current flow through the meter to a safe value, full scale. Consider the circuit shown in Fig. 3.22(A). In this circuit the battery, B_1 , is used to power the load and it is necessary to measure the battery voltage to be sure that it is producing a full 100 volts. The meter used has a 0-1 mA, 50 ohm movement and if, as shown, it is connected in parallel with the battery, it will burn out. The reason for this is that the only limitation to the flow of current through the meter is the meter resistance, 50 ohms. Since $I = E/R$ or $100/50$, 2 amperes will flow through a 1 mA meter burning it out.

By placing the resistance R_1 in series with the meter as shown in Fig. 3.22(B),

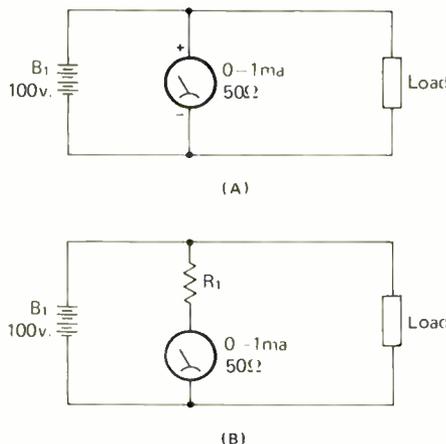


Fig. 3.22(A)—Placing a milliammeter across a voltage source in an attempt to measure voltage will result in a burnout of the movement. **(B)** The addition of a series resistor, R_1 , limits the current flow through the meter permitting the indication of the presence of voltage without damage.

we can limit the current through the meter to a safe value, 1 mA. For an applied voltage of 100 and a maximum current of 1 mA we have $R_1 = E/I = 100/0.001 = 100K$.

With a 100K resistor wired in series with the meter we know that the application of 100 volts will cause a flow of 1 mA, full scale deflection. Any time the meter, when wired as shown, reads 1 mA we know *there must be 100 volts across the meter-multiplier combination*. Therefore, as shown in Fig. 3.23 the 0-1 mA meter face can be recalibrated to show 100V at the 1 mA mark.

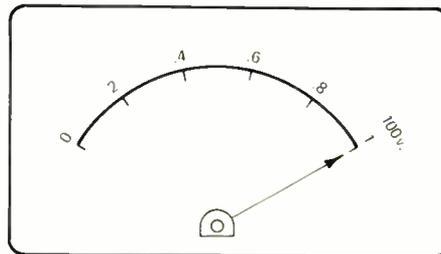
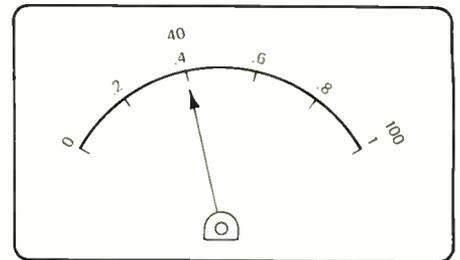


Fig. 3.23—With the proper series resistor (100K) a full scale reading of 1 mA indicates the application of 100 volts.

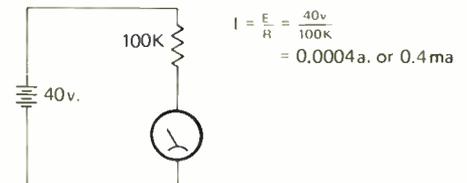
If the same meter-resistor combination is placed across a circuit where there is only 40 volts present the current flow will equal $I = E/R$, $40/100,000 = 0.4$ mA. The pointer will now swing as far as 0.4 mA on the scale indicating the presence of 40 volts (Fig. 3.24). If applied across a 60 volt circuit the current through the meter would be $60/100,000$ or 0.6 mA. In this manner we could calculate the relationship between the current and voltage over the entire scale and arrive at the calibration shown in Fig. 3.25. Basically, what we have is a multiplier of 100. Every current reading, multiplied by 100 will give us the correct voltage reading.

To produce a range of 0-500 volts, it would be necessary to use a different value of series multiplier. For 500 volts full scale the value would be

$$R = E/I = 500/0.001 = 500K$$



(A)



(B)

Fig. 3.24—With a 100K multiplier and an applied voltage of 40V, the meter current registers 0.4 mA. This current then corresponds with an external voltage of 40V and can be so marked on the scale.

Multi-range Voltmeters—Such a single range voltmeter is not a practical test instrument; it is necessary to provide a selector switch to vary the meter range. How this is done is shown in Fig. 3.26. In this position one of the range selector switch, 1V FS, we need a resistor value

$$R_1 = E/I = 1/0.001 = 1K$$

In position two, 50V FS, we need

$$R_2 = E/I = 5/0.001 = 50K$$

In position three, 100V FS, we need

$$R_3 = E/I = 100/0.001 = 100K.$$

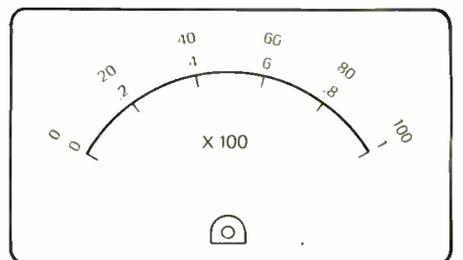


Fig. 3.25—A fully calibrated 0-100V scale for a 0-1 mA meter.

Experiment #13—How to Construct a Voltmeter

Materials:

- 1—0-1 mA meter, Radio Shack #22-052
- 1—10K ½ watt resistor, Radio Shack #271-034
- 1—100K ½ watt resistor, Radio Shack #271-045
- 1—Perfboard, Radio Shack #276-1583
- 6—Fahnestock Clips, Radio Shack #270-393 assorted hardware and wire
- 1—9V battery

The voltmeter we are constructing will not be as accurate as the 22-202A Radio Shack unit because we are using $\pm 10\%$ multipliers. However, it *may* be accurate depending upon your luck with the resistors.

Procedure:

1—Wire the circuit shown in Fig. 1 using the layout shown. Be sure to set the bottom fahnestock clips at an angle as shown.

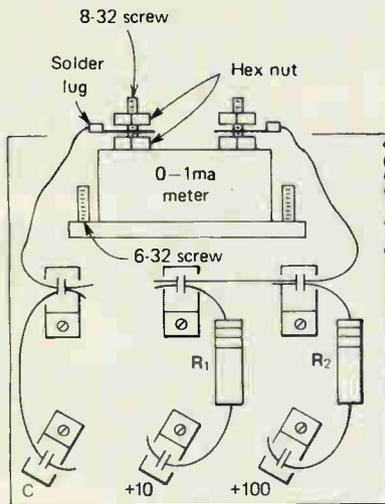


Fig. 1—Layout and circuit of the two range voltmeter. The bottom clips are angled to permit the test leads to clear the adjacent clips.

2—Connect the black test lead to the common terminal and the red test lead to the 10V terminal.

3—Measure the voltage of the 9V battery with the meter just constructed. Multiply the scale reading by 10 and enter the voltage in chart I below.

1K/V meter	20K/V meter
V =	V =

Chart I

4—Measure the same battery voltage using the 20K/V meter. Enter the voltage in Chart I and compare the two readings. They will be very close if the 1K/V multipliers are reasonably accurate.

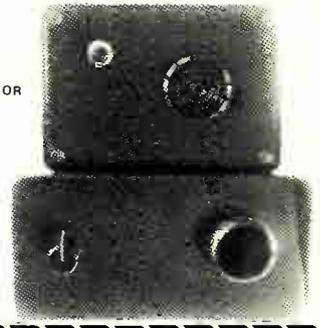
5—Move the red lead to the 100V position and remeasure the 9V battery. Multiply the scale reading by 100 for the correct voltage. Do not disassemble the meter as it will be used in the next experiment, meter loading.

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Voltmeter Sensitivity—The sensitivity of a voltmeter is indicated by the number of ohms in the series multiplier for each volt of the meter range. In the circuit shown in Fig. 3.26, we see 1000 ohms for each volt of meter range. For example, on the 0-1 volt range, we use a 1K multiplier; for the 0-50V range, a 50K multiplier and so on. If we were to add a 500 volt range, it would require a fourth switch position and a 500K resistor.

We can conclude that for a 0-1 mA meter we need 1000 ohms of multiplier resistance for each volt of the full scale range desired. It is expressed as 1K/volt or 1000 ohms-per-volt.

If we make a voltmeter from a 0-500 μ A (0-0.5 mA) meter movement the sensitivity will be different than for the 0-1 mA meter. For the 1 volt range the multiplier will have to be

$$R = E/I = 1/0.0005 = 2,000 \text{ ohms}$$

Thus, a voltmeter formed from a 0-500 μ A movement has a sensitivity of 2K/V.

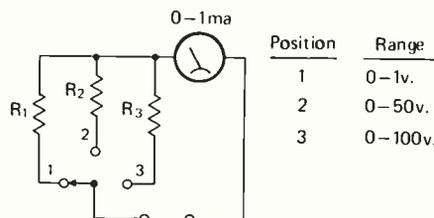


Fig. 3.26—A three range voltmeter requires a three position selector switch and three multiplier resistors.

For a 0-50 μ A meter movement, the multiplier resistor for a 1 volt range would be

$$R = E/I = 1/0.00005 = 20K \text{ producing a sensitivity of } 20K/V.$$

The higher the ohms-per-volt rating of a voltmeter, the more sensitive the meter and the more desirable it is. Basically, what the sensitivity rating tells us is that the higher the ohms-per-volt rating the less current the meter must draw from a circuit to provide a voltage reading.

Voltmeter Accuracy—The accuracy of a voltmeter is dependent upon several fac-

tors. The first is the accuracy of the meter movement itself, usually 2 to 3% for VOM's and panel meters.

Further accuracy problems are caused by actual resistance value of the multiplier and to some small degree, the resistance of the meter movement. Consider, once again, the circuit shown in Fig. 3.24. When the meter and multiplier are connected in parallel with a 100 volt source precisely 1 mA will flow through the meter to produce full scale deflection indicating 100 volts. For this to happen the total resistance of the multiplier and meter movement *must be precisely 100K*. But is it? If the multiplier is exactly 100K and the meter movement is 75 ohms, then the total resistance is 100,075 ohms. To be precise, and compensate for the movement resistance, the multiplier should be 100,000-75 or 99,925 ohms. Is such a precise value available? Not ordinarily.

If the 100K resistor used is a $\pm 1\%$ unit its range of resistance will be 100K \pm or 99K to 101K. If a 1% resistor can have this range of error why be concerned about 75 ohms? When selecting

Experiment #14—Meter Loading

Materials:

Perfboard with the 1K/V voltmeter from previous experiment.

2—100 ohm resistors, Radio Shack #271-010

2—100K resistors, Radio Shack #271-045

3—Fahnestock clips, Radio Shack #270-393

1—Battery connector, Radio Shack #270-325

1—9V Battery

The purpose of this experiment is to illustrate how a low resistance voltmeter can affect the voltage readings in a high resistance circuit. Readings taken with a 1K/V meter constructed in the previous experiment will be compared to the readings taken with a 20K/V meter in both a high resistance and low resistance circuit.

Procedure:

1—Add three fahnestock clips to the right side of

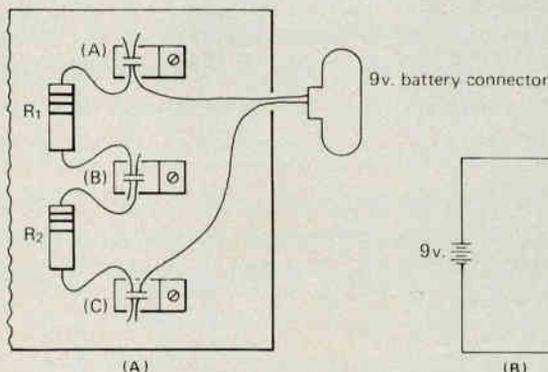


Fig. 1(A)—Voltage divider constructed on the right side of the perfboard. (B) Simple voltage divider circuit.

the perfboard as shown in Fig. 1(A) and add two 100K resistors to form the circuit shown in Fig. 1(B). Connect the battery.

2—Measure the voltage across R_2 using the 1K/V meter built on the left side of the perfboard. Enter the reading in Chart I.

3—Measure the voltage across R_2 again but this time use the 20K/V VOM and enter the reading in Chart I.

Note the following:

A) The voltage measured with the 1K/V meter is very low, much less than the expected 4.5 volts.

B) The 20K/V is much more accurate, that is, it reads closer to the expected 4.5 volts.

4—Replace the two 100K resistors with two 100 ohm $\frac{1}{2}$ watt units. Connect the battery.

5—Measure the voltage across R_2 using the 1K/V meter on the board. Enter the reading in Chart I.

6—Repeat the same measurement using the 20K/V VOM and enter the reading in Chart I.

Note the following:

A) The meter reading of the 1K/V and 20K/V are almost the same.

B) The 1K/V meter is a dependable device in low resistance circuits.

Meter	1K/V	20K/V
R_2 100K	V =	V =
R_2 100 Ω	V =	V =

Chart I

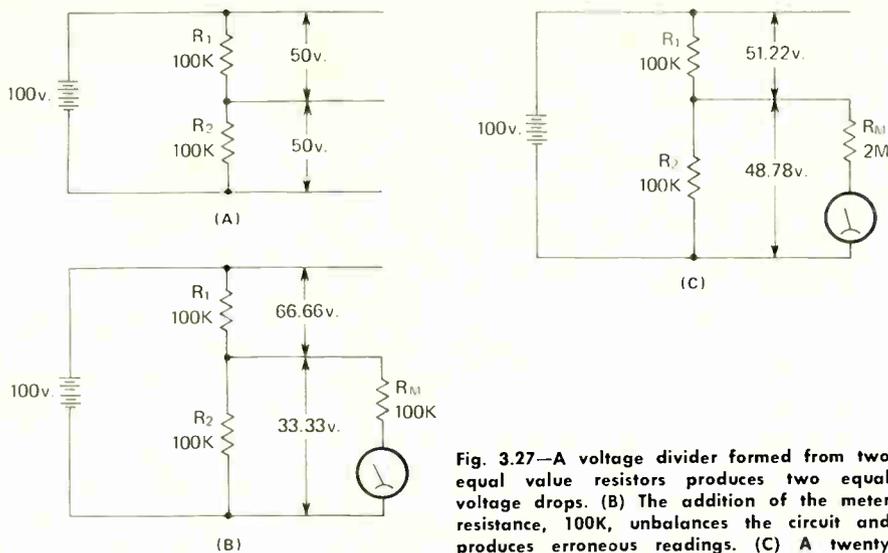


Fig. 3.27—A voltage divider formed from two equal value resistors produces two equal voltage drops. (B) The addition of the meter resistance, 100K, unbalances the circuit and produces erroneous readings. (C) A twenty thousand ohm per volt meter produces a more accurate reading as it draws less current from the circuit.

resistances for multipliers choose the most accurate available.

Voltmeter Loading—If we select a very accurately calibrated voltmeter, it is reasonable to expect precise readings when making voltage measurements. Under certain circumstances you will not get these expected accurate readings despite the quality of the voltmeter. The reason for this can be best understood by examining Fig. 3.27(A) where we see two equal value resistors in series connected across a 100V source. We know from our understanding of Ohm's Law that the 100 volts will divide equally across each resistor, 50 volts each. To assure ourselves that we *really* have 50 volts across each resistor, we measure the voltage with a 1K/V meter such as that shown in Fig. 3.26. Instead of 50 volts, we measure 33.33V. (continued)

Experiment #15—Constructing an Ohmmeter

Materials:

- 1—0-1 mA meter, Radio Shack #22-052
- 1—8.2K resistor, Radio Shack #271-033
- 1—10K linear pot, Radio Shack #271-1715
- 1—Battery Connector, Radio Shack #270-325
- 6—Fahnestock Clips, Radio Shack #270-393

The construction and operation of the ohmmeter is being performed to reinforce the concepts involved. You will find that due to the lack of calibration on the meter face, the unit is not too practical. To truly be useful the meter would have to be disassembled

and the ohmmeter calibration handprinted on the face, a tedious and critical task. Again, all we are doing here is reinforcing basic concepts.

Procedure:

- 1—Wire the circuit of Fig. 1(A) using the layout shown in Fig. 1(B).
- 2—Connect a wire between clips A and B and adjust R_2 for a full scale reading.

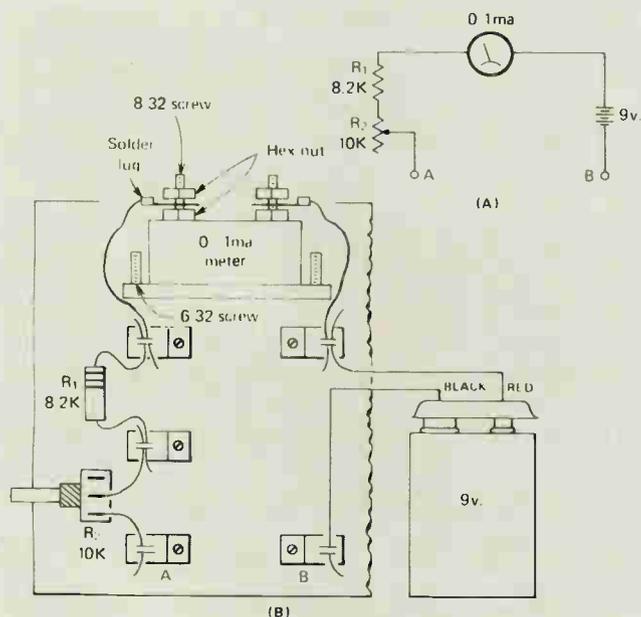


Fig. 1(A)—Circuit of a simple ohmmeter to be laid out as shown in (B).

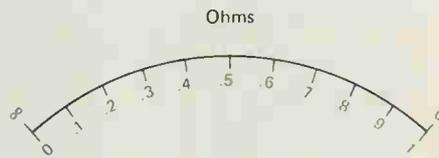


Fig. 2—Enter the resistance values at the corresponding current readings as directed in the text to produce a resistance calibration.

- 3—Connect several resistances across terminals A and B and note the current flow. Enter the figures in Chart I as shown for several values.

Resistance	I in mA
100 Ohms	
1.2K	
3.3K	
4.7K	
8.2K	

Chart I

- 4—Using the current and resistance figures from Chart I above, calibrate the meter face shown in Figure 2.

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BASIC RADIO (continued)

To understand why this happened we can examine Fig. 3.27(B) where the meter measuring the voltage across R_2 is shown as a 100K resistance in parallel with R_2 . The equivalent resistance of R_2 in parallel with R_M is 50K. This resistance, 50K, in series with R_1 , 100K, produces a total of 150K. This means that with the voltmeter connected into the circuit the division of voltage between R_1 and the parallel combination of R_2 and the meter, will be 2 to 1 or 66.66 volts to 33.33 volts. When the meter is removed the voltages will return to normal, 50 volts across each resistor.

To measure the voltage in a circuit containing high resistance values such as those of Fig. 3.27, it is necessary to use a voltmeter with a sensitivity greater than 1K/V; 20K/V is more suitable. If we use a 20K/V meter, as shown in Fig. 3.27(C), on the 100 volt range, we will read 48.78 volts, an error of only 1.22 volts. The improvement is due to the higher resistance of the meter on the 100 volt range, 2 megohms. This is parallel with R_2 drops the equivalent to 95,238 ohms, giving us a voltage reading close to the expected 50 volts.

If we were to use a 30K/V or 50K/V meter, the accuracy would be still greater. Further problems of meter loading are discussed in Experiment #14.

Ohmmeters—Ohmmeters were discussed briefly earlier in Information Sheet #5. The circuit of a simple ohmmeter using a 0-1 mA meter is shown again in Fig. 3.28(A). It uses an internal battery of 4.5 volts, a 4K fixed resistor and a 1K pot. Basically, we have a 0-4.5 volt meter when points A and B are shorted and the 1K pot is adjusted to 500 ohms.

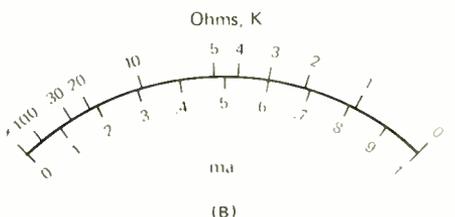
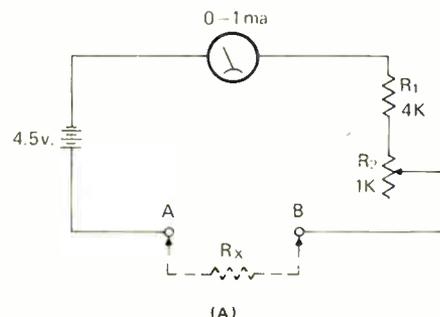


Fig. 3.28(A)—Circuit of a basic ohmmeter. (B) Calibration of the non-linear ohmmeter scale as calculated in the text.

The meter then reads full scale and represents zero ohms resistance between terminals A and B. As the battery ages and produces less voltage, the 1K pot can be readjusted to produce the desired zero reading and R_2 is, therefore, referred to as the *Zero Adjust* control. This adjustment must be made each time the ohmmeter is used and checked when the range is changed in the VOM.

After the ohmmeter is zeroed, the unknown resistor to be measured is connected between terminals A and B of Fig. 3.28(A). The addition of this resistance into the series circuit reduces the current flow by raising the resistance and the meter no longer will read full scale. If a 1K resistor is connected between terminals A and B, the total circuit resistance would be $R_1 + R_2 + R_x$ or $4.0K + 0.5K + 1K = 5.5K$. The new current flow in the circuit would now be

$I_M = E/R_T = 4.5/5500 = 0.8181\text{mA}$. We may then mark 1000 ohms on the 0-1 mA scale at 0.8181 mA as shown in Fig. 3.28(B). Calculations for various values of R_x and their corresponding meter readings are shown below.

- 2K $4.5/6500 = 0.692\text{ mA}$
- 3K $4.5/7500 = 0.6\text{ mA}$
- 4K $4.5/8500 = 0.529\text{ mA}$
- 5K $4.5/9500 = 0.4736\text{ mA}$
- 10K $4.5/14500 = 0.31\text{ mA}$

- 20K $4.5/24500 = 0.1836\text{ mA}$
- 30K $4.5/34500 = 0.1304\text{ mA}$
- 100K $4.5/104500 = 0.043\text{ mA}$

By plotting all these (and more) current figures on the 0-1 mA scale of Fig. 3.28(B) we can produce a well calibrated ohmmeter scale. The final reading, infinity, is obtained with no resistance at all across A-B and is shown on the meter face with the mathematical symbol for infinity.

Observe how the higher resistance readings begin to crowd together resulting in very inaccurate readings above 100K. To increase the meter range for the circuit shown in Fig. 3.28(A) it would be necessary to increase the voltage and change the multipliers. Modern VOMs, using low range microammeters ($50\ \mu\text{A}$) can measure a very wide range of resistance using sophisticated circuits and a 1.5V battery.

SELF CHECK QUESTIONS

- 1—A voltmeter is a milliammeter with a parallel resistor. T or F
- 2—A 0-20 microammeter is to be set up with a 0-25 volt full scale reading. What is the value of the series multiplier needed?
- 3—A 10K/V meter has to be set up for a 0-250 volt range. What value multiplier must be used?

4—Which is a more desirable VOM, a 10K/V or 100/V unit?

5—Why is it usually unnecessary to compensate for the meter movement resistance when calculating a meter multiplier?

6—Why do we get erroneous readings in high resistance circuits when 1K/V meters are used?

7—A 0-500 microammeter is to be used with a 9V battery to form an ohmmeter. The combined multiplier and zero adjust control must be able to adjust to _____ ohms.

- 7—1800 ohms so changes the voltage reading.
to cause excessive voltage drops and
rent through a high resistance circuit
6—A 1K/V meter draws sufficient current through a high resistance circuit
of the multiplier and critical values of
ally less than the 1% tolerance error
5—Because the meter resistance is usually less than the 1% tolerance error
4—100K/V is the more desirable meter.
3— $250 \times 10\text{ K} = 2.5\text{ megohms}$
2—1.25 megohms the meter.
1—F, the resistor is placed in series with the meter.

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SECRETS OF EXTENDING CB RANGE

by Al Friedman, President Chemtronics Inc.

EVERY CBer wants to extend his range. He'd like to put out signals so strong that nobody can *walk on him* and he wants to get *wall-to-wall* reception from great distances.

A 2-way CB system comprises a transmitter, a receiver and an antenna. (Fortunately, a single antenna can be used both to radiate signals and to receive signals. It does both jobs with equal efficiency.) This is called "reciprocity".

To increase transmitter range, we have to increase the power of the signals we radiate. Unfortunately, there is a limitation. The FCC rules say that the most a CB transmitter can put out legally is 4 watts. In fact, most CB transceivers put out only 3 watts.

There is, however, something we can do. We can turn to the antenna to give us more powerful transmissions. This brings us to the concept of antenna "gain", a term that is widely misunderstood. An antenna doesn't really supply gain. It doesn't amplify signals. It simply radiates existing signals, more or less efficiently, and concentrates the available power in specific directions. When we refer to antenna gain, we are referring to the antenna's ability to transmit (or receive) signals of a specific frequency in a given direction. The antenna under discussion is compared either with a tuned di-

pole or an isotropic antenna. Since the dipole concentrates some of the radiated power in a figure 8 pattern, it has gain compared to an isotropic antenna (i.e. one that radiates equally in all directions).

The one thing to keep in mind is that antenna impedance and directivity is frequency sensitive. The optimum length of an antenna element is related to the wavelength, which is inversely proportional to the frequency. In CB, most manufacturers work with half wavelength elements, which at 27 MHz are about 17 feet long, or quarter wavelength elements, which are about 8½ feet long. (The CB wavelength is 11 meters, or about 36 feet. Element thickness and end effect reduce the size of ½ wavelength and quarter wavelength elements to 17.3 and 8.6 feet respectively.) If the element is *not* the right length, you have a mismatch. Some of the signal is reflected back toward the transmitter, to form standing waves. Match is also affected by the transmission line (RG-58 or RG-8 coaxial cable) used between the transmitter and the antenna. For this reason, it is usually necessary to "fine tune" the length of the antenna for minimum standing waves and maximum radiation in a given installation.

Once you have a good impedance match and antenna elements of the right length, you are radiating

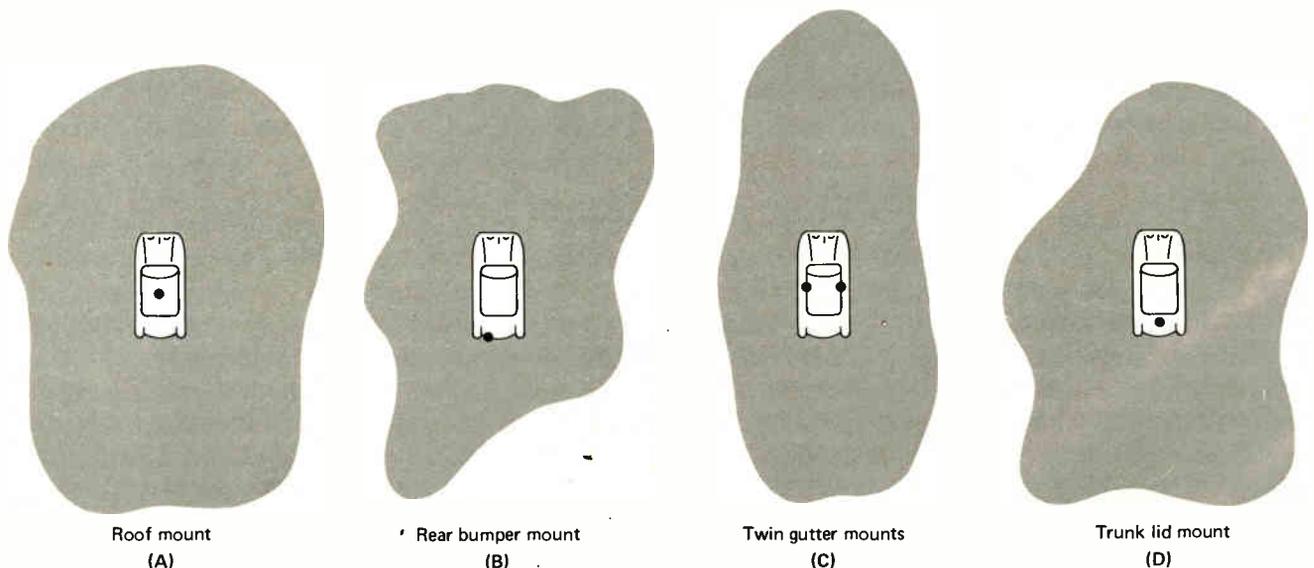
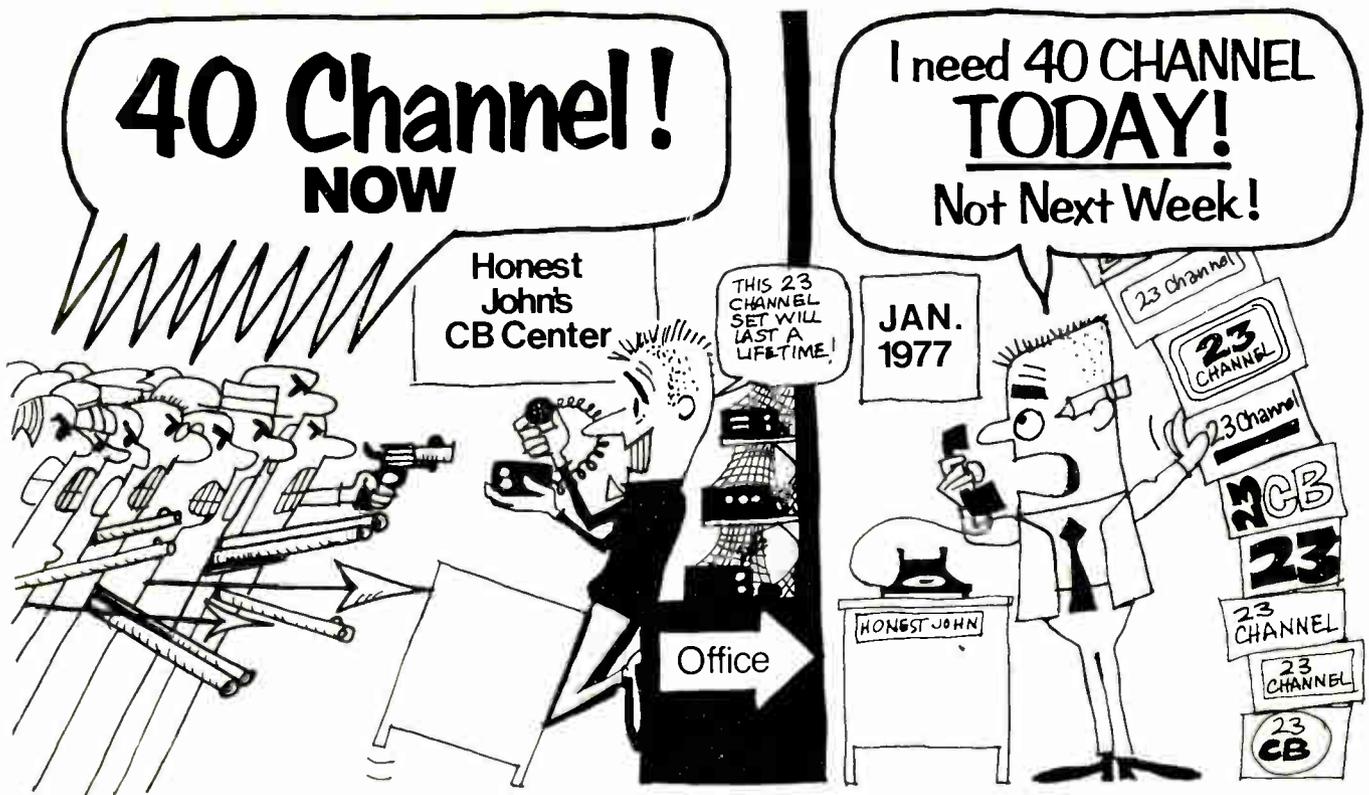


Fig. 1—Typical polar patterns for mobile CB antennas.



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the maximum available transmitting power. But there is still something more you can do. You can shape the transmitting beam. Instead of radiating signal equally in all directions, you can focus your transmitting beam in one or more directions. It's the same principle we use in focusing light in a flashlight. Instead of diffusing the light from a bare bulb equally in all directions, we use reflectors to send a beam in one single direction. This beam is many times stronger in our chosen direction than the unaimed beam, so we might say that the flashlight provides gain. A good base station CB antenna can give you up to 50 watts of effective radiated power. This is what we mean by gain.

There are limitations to beam shaping in mobile antennas. For one thing, you can't aim the antenna in a given direction to the exclusion of other directions because this would mean that when the road curves you would lose contact. For another thing, the vehicle on which the antenna is mounted skews the polar pattern. A trunk mounted antenna pattern is quite different from a roof mount pattern, as shown in Figure 1.

Let's leave the theoretical aspects of CB transmission and get down to cases. What can we do to increase transmission range? There are several steps we can take:

1. For a base station, we can use a high gain antenna (colinear, beam, yagi, etc.) mounted on a high tower (the FCC now allows up to 60 feet), preferably with a rotor.

2. For a mobile station, we can use the best antennas we can find. A full $\frac{1}{4}$ wavelength (8.6 foot) whip (mounted on the bumper for convenience) works very well. Shorter antennas using loading coils to simulate the extra length work reasonably well, and are very practical in terms of size and wind resistance. Twin antennas, properly phased can give you a couple of dB gain (3 dB is the theoretical maximum for dual antennas), so they are highly recommended for CBer's looking for maximum mobile range.

3. Check your transmissions carefully. Adjust for minimum standing waves, and maximum radiated power.

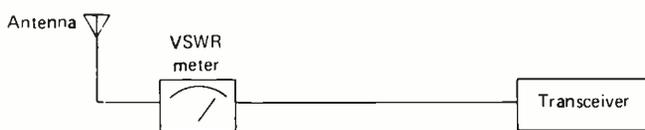


Fig. 2—Use of VSWR meter to adjust antenno length for minimum VSWR.

VSWR AND FIELD STRENGTH

How can we be sure of minimum VSWR and maximum radiated power? Two pieces of test equipment are required. Figure 2 shows how to use a VSWR meter. Notice that the meter is close to the antenna, not near the transmitter. This is important. Connecting the VSWR meter on the transmitter side includes the cable in the matching system and may introduce losses due to the cable. If the antenna is matched so that no standing

waves are on the cable to the transmitter we minimize the losses in the transmission system.

With the VSWR meter in place, key the transmitter (but don't talk) and take a reading. If you get an SWR reading of 2:1, or less you're in good shape. A reading of 3:1 is not acceptable.

To improve the VSWR, first try adjusting the length of the antenna. Most mobile antennas have Allen wrench set screws which enable you to lengthen and shorten the antenna within a narrow range.

If this doesn't work, try a T-Pad with a stub, as shown in Figure 3. Install the T-Pad as close to the antennas as possible. The stub is nothing more than a hunk of coax cable (RG-8 or RG-58) about 96" long ($\frac{1}{4}$ wavelength). Stick a pin through the end of the coax cable stub, to short the braided shield to the center conductor. Key the transmitter and take an SWR reading. Repeat this procedure, moving the pin about

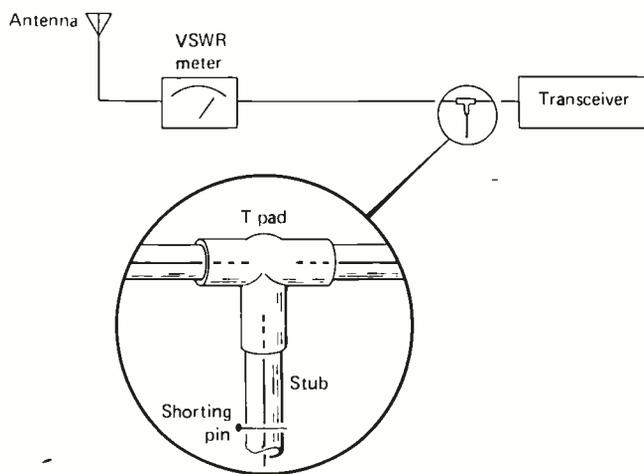


Fig. 3—Use T-Pad with stub to minimize VSWR.

an inch down the cable stub at a time. You are changing the electrical length of the cable. As you move the shorting pin down the stub, VSWR should decrease, and then, at some point, start to increase. The point of minimum VSWR is the length of stub you are looking for.

You could just leave the pin in at that point, but you want a stable, low resistance connection. Cut the cable at the point of minimum resistance. Then, twist the center conductor and the shield together to form a shorted stub, as shown in Figure 4. Solder and tape the connection, for best results.

Use the Field Strength Meter to take readings of your output power. This can be a little tricky. For one thing, readings are not absolute but relative. The distance of the FSM from the transmitter, proximity of metal, buildings, etc., even the presence of people affect FSM readings. If you use the FSM at a calibrated distance from the antenna in a controlled environment (not too close to anything) and compare one transmitter/antenna rig with another, however, you may be able to spot some serious problems.

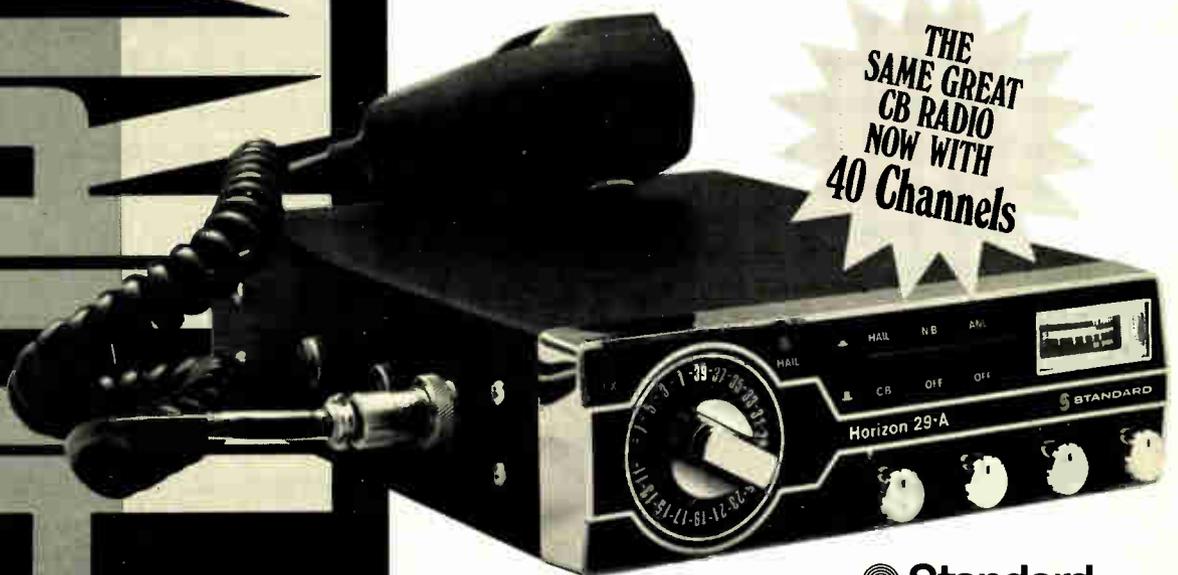
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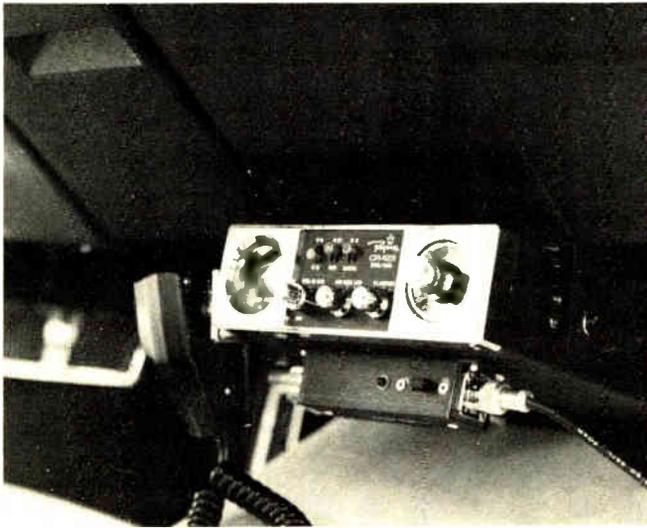


Fig. 4—CB Preamp mounted to transceiver.

shorting stub, just to see what a difference improving the VSWR makes in the effective radiated power.

CB RECEPTION

Aside from using a good antenna and minimizing SWR, there is not much we can do to improve CB transmissions. We can, however, improve CB reception a great deal.

In the first place, anything we do to the antenna system to improve transmission improves reception as well. In the second place, there are no legal restrictions on improving reception sensitivity. Therefore, under many conditions, a CB receiver preamplifier can be a tremendous help in extending reception range.

CB Preamps such as that shown in Figure 4 improve CB reception in two important ways:

1. They amplify incoming signals, providing about 20 dB gain. (20 dB gain is an increase of 10 times signal voltage, or 100 times signal power.)

Unfortunately, preamplifier gain is not nearly as effective in improving reception range as antenna gain. Because the preamplifier amplifies noise just as much as it amplifies signal. However, in many cases, extra gain up front can take a weak incoming signal over the threshold required by receiver's detector stage. Further, front end gain enables the CBer to turn down the volume control, minimizing noise content. For this reason, some deluxe CB transceivers incorporate extra RF gain, with an RF gain control. Preamps add the benefits of this feature to any CB transceiver.

2. They improve the signal-to-noise ratio. This is the big advantage of CB preamplifiers. A brief explanation will help you to see why.

As you might suppose, the Signal-to-Noise ratio expresses the relationship of signal power to noise power. Since they are in the same frequency range, no circuits in the CB preamplifier or the CB transceiver can distinguish between noise and signal.

Suppose, for example, that the signal is 100 microvolts and the noise is 10 microvolts. The signal-to-noise

ratio is 100 to 10 or 10 to 1. Another way of expressing this is to say that the signal-to-noise ratio is 20 dB, since 20 dB equals 10 times voltage.

Now, suppose you amplify that same signal to 20 dB. You then have a signal of 100 microvolts and noise of 100 microvolts. The signal is stronger, but the signal-to-noise is the same, 10 to 1. As far as hearing the desired signal is concerned, improvement is slight.

However, there is another factor to consider. No piece of electronic equipment is perfect. Every CB transceiver adds noise of its own. The amount of noise added by an electronic device is expressed in terms of noise figure. We won't go into the mathematics formulas, which are based on Boltzman's constant, but the noise figure is actually a comparison between the noise generated by the electronic device, compared with the noise generated by a resistor at the same temperature across the same bandwidth.

If the equipment were perfect, it would generate the same amount of noise as the theoretical resistor, or 0 dB. (0 dB equals unity.) The noise figure of a transceiver is usually between 2 dB and 6 dB. In other words, the average transceiver adds 1.58 times (2 dB) to 4 times (6 dB) as much noise power as would a resistor at room temperature. The less noise the receiver adds, the smaller an input signal it can work with.

A good preamplifier has an exceptionally low noise figure. In other words, it adds considerably less noise than the transceiver. And once the signal is amplified 10 or 20 dB, the amount of noise added by the transceiver becomes negligible. Therefore, a preamp can improve output quality significantly, provided it supplies at least 10 dB gain and provided its noise figure is at least half a dB better than the transceiver with which it is used. It's the improvement in signal-to-noise ratio that makes the real difference.

A signal-to-noise ratio of 10 dB is, of course, related to receiver sensitivity, which is expressed in the number of microvolts of signal required to give you an output where signal plus noise (S+N) exceeds noise along (N) by a factor of 10 dB. ($20 \log (S+N)/N = 10 \text{ db}$)

A good transceiver may be specified as having a sensitivity of 1 microvolt. Using the formula, we see that the noise component is about .46 microvolt for that particular receiver. $(1 + .46)/.46 = 3.17$ or 10 dB) Obviously, the better the sensitivity, the lower the noise figure of the transceiver. A good preamp will improve the performance of any CB transceiver, but it produces more dramatic results when used with transceivers with sensitivity greater than 1 microvolt.

In some cases, a CB preamp with a noise figure better than 2 dB can double or triple the usable reception range of a transceiver.

Of course, the preamp cannot be used when the transceiver is in the transmit mode. Therefore, CB preamps incorporate a built-in relay circuit that automatically

(continued)

by-passes the preamp when the transmitter is keyed and when the preamp is switched off.

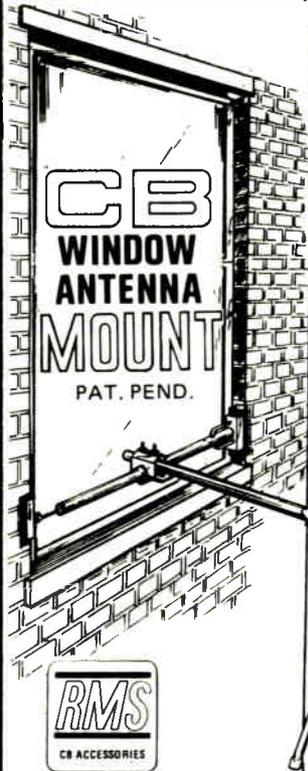
Some preamps are made for AM use and some are made for SSB operation. The unit shown in Figure 5 works automatically on both AM and SSB, with no switching necessary.



Fig. 5—Typical Preamp.

CB preamps can be installed anywhere between the transceiver and the antenna, but they should be convenient to the driver so they can be switched off in the presence of strong signals.

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NEXT MONTH IN CB RADIO/S9:

■ N case you haven't noticed, street crime is rampant—and CB'ers are among the prime targets. Well, other folks are also in this boat too; and muggings, rapes, armed robberies, assorted burglaries seem to be increasing at a rate which has proven to be far beyond the abilities of anybody to squelch them. One of the problems is that news of these acts does not always filter through to law enforcement authorities until the damage has been done and the criminals have long since fled off into the night. Can something be done to aid law enforcement authorities—to get the news of in-progress crimes to them faster **CB RADIO/S9 MAGAZINE** says, definitely YES! Next month in **CB RADIO/S9** read about **S9 CB CRIMEWATCH** which can put you and your CB equipment into the battle against street crime—legally, effectively, safely, and for the benefit of your community.

Watch for it in the March issue of **CB RADIO/S9**—tell your good buddies about it. **S9 CB CRIMEWATCH** is on the way!

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The Aquarius CB Personality

JANUARY 20-FEBRUARY 18

by Paperdoll—KMI 4549

MERCI sakes! The Aquarian Age brings forth one of the most popular modes of communication—CB radio—created by the sparkies of the horoscope, futuristic Aquarians who are always ahead of their time. An aura of charged-up electrical energy surrounds these space age inventors who love to weave way out fantasies with special effects. For their dreams they need plenty of time alone. A don't disturb sign is a must for eccentric Aquarian hermits whose mental energy cannot be restrained. Key word for this air sign is freedom. Often called rebels due to their own very different beliefs, they're definitely rebels with a cause. Humanitarians, fer sure. Always for the underdog, they'll fight to the end for liberty and justice for all. These free-spirited wanderers don't just drift around dead-peddaling down the boulevard. They love speed and hammer down to their final 20. Rather be caught dead than doing the double nickel. Daredevil Aquarians, the likes of Evil Knievel and Paul Newman, are to be found behind the wheels of racy sprint cars, speedy two-wheelers, and 747's. Always up in the clouds—even with four wheels on the ground. Typical handles for these superslab streakers might be: Moving Violation, Zoomer, Batman, Robin Hood, Downhill Racer, The Streaker.

FEBRUARY STARCHECK

AQUARIUS—Space age Aquarians have enough unleashed energy this month to shuttle them to the nearest space station. They're definitely in orbit on the 24th when a good buddy puts the good numbers upon them. Aquarians ruling planet Uranus backtracks in career sector February 14th. Personal problems may cause a setback at that time. Avoid saying or doing anything that may cause 40-channel scandal.

PISCES—February 24th puts a heap of greenstamps in Pisces poor piggybank. Now they can hammer down to those distant 20's they've only been able to dream about. Do not entrust your intimate secrets to anyone this month or you're liable to hear them echoed over the frequency.

ARIES—Aries attracts this month and meets a meaningful new good buddy cutting through that cold, dry fluff stuff. Time for that frolicking apres ski and CB. Joint financial ventures may take a downward turn for the worst on the 14th. Definitely not a time to invest.

TAURUS—Taurus, riding high on a wave of good fortune these days, is still not without those more common everyday upsets that beset us—such as a confrontation at the work 20 after the 12th that leaves them worried and sleepless for awhile. If dealt with honestly and head-on, the outcome will pleasantly surprise you.

GEMINI—February is a month of confusion, especially for the disorganized Gemini. A troubled Scorpio co-worker breaks down and uses your shoulder on Valentine's Day throwing a carrier on your romantic plans. That special YL or buffalo stands by, though, and gets you through the month. Some idealistic plans may be made on the 24th. An important 10-5 comes through on the 18th at work 20.

CANCER—Normally warm weather sports enthusiasts, Cancerians this year decide to take to the hills for some thrilling schussing on short slats. Take extra care after the 14th when you may get too reckless and wind up a snowball. End of February puts better half in a better frame of mind. Hang on to all greenstamp records—liable to be a question regarding what you really owe.

LEO—Leo, the ruler, has some assertive words with better half this month and just won't give a break. Those accumulated QSL cards may come in handy as you do some foreign travelling in connection with career this February. Your strong business acumen affords this luxury.

VIRGO—Pack 'em down on the boulevard to the double buffalos and get that motorizing mobile tuned up and checked over. Keep a sharp eyeball for those crazy Harvey Wallbangers that might cross your path. It's back to the junkyard to catch up on that accumulated work you left behind. Co-workers aren't too happy with the extra work they've shared for you. Other half has unexpected surprise for you the 18th.



LIBRA—Libra throttles down to mountain town for some racy winter sports each leisurely free February moment. Extravagance catches up with you February 14th, after which time you'd better start a new piggybank. Other half is extra loving this month and pampers you.

SCORPIO—Intense Scorpio feels a bit neglected after a lonely Valentine's Day, but mood is sparked up on the 18th when a super new YL or buffalo puts the pedal to the metal to meet you. Work 20 could be the scene of this explosive new attraction. Home 20 is stirring with unusual amount of activity this month, and may also require some necessary repairs.

SAGITTARIUS—Better keep your ears on all month Sagittarius, as you'll be racking up the miles on the boulevard in your country Cadillac, fer sure. Some aesthetic-looking stranger is welcomed to your home 20 around the 18th. Your 20-20 candles are lit, 10-4! You'll be stacking them eights the rest of February.

CAPRICORN—Close relatives are heard from this month, while one particular good buddy is not. Seems as though a once trusted one has gone 10-7 owing you a few greenstamps. Better get on that upper or lower side to get out to him and retrieve that lettuce. Your vibes will definitely be felt. Home 20 is spruced up just before that significant superior is invited to dinner. The 24th is a good day to make that bodacious impression.

73's and 88's till next month

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FCC SEIZES \$65,000 IN RADIO GEAR

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A stack of amateur transceivers which were modified for out-of-band operation. Equipment is being set up for frequency power measurements.

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Robert M. Mroz (Left) and Donald W. Bogert (Right) noting the frequency range capability of one of the illegal pieces of equipment.

Note frequency at 27.9099 MHz and power output of 80 watts.

ROBERT M. Mroz, FCC Engineer in Charge at Baltimore, Maryland has announced that approximately \$65,000 in allegedly illegally used radio equipment was seized on October 27, 1976 in a crackdown on illegal radio broadcasting in the Baltimore-Washington area.

The seizures were the result of an extensive investigation by the FCC into the operation of illegal radio stations which were allegedly transmitting on unauthorized frequencies, operating overpower equipment, and violating other FCC regulations.

The investigation was conducted under the supervision of Donald W. Bogert, Assistant Engineer in Charge, at Baltimore, Maryland with the close cooperation of the monitoring station at Laurel, Maryland.

Among the seized equipment were many high powered and sophisticated transmitters and oscillators.

Mr. Mroz alleged that the illegal stations were not only causing interference to legitimate CB users, but were causing disruption to business radio, and local, state, and Federal government radio users, and AM/FM and television reception.

Federal law provides penalties of up to \$500 per day, per offense, for violations of the FCC regulations involved, and one year imprisonment and a \$10,000 fine for the unlicensed use of CB or amateur radio equipment.

United States marshalls from Baltimore and Washington accompanied by FCC agents from Baltimore, Washington, Philadelphia, and Norfolk district offices and the Special Enforcement facility at Laurel, Maryland simultaneously executed nineteen search warrants in the Baltimore, Annapolis, Washington Metropolitan area, seized the equipment, and closed down the stations.

This is the largest simultaneous execution of search and seizure warrants against illegal radio operators in the country, made possible through the close cooperation and coordination among the U.S. Attorney's office, the U.S. Marshalls' offices in Baltimore and Washington, D.C. and the Federal Communications Commission.

(continued)

Robert M. Mroz notes the external switching arrangements utilized in the confiscated equipment to allow out-of-band operation.





Robert M. Mroz (Left) and Donald W. Bogert (Right) taking inventory of some of the confiscated equipment.

HOW THEY DID IT

The search and seizures were executed by eleven teams consisting of two Federal Marshalls and one FCC agent. Dossiers were prepared on each of the subjects and distributed to the teams in preparation for the crackdown raid. Seven of the eleven teams rendezvoused at 6:00 AM just off the Washington Beltway and were under the supervision of Robert M. Mroz, Engineer in Charge, Baltimore, Maryland. Four of the eleven teams rendezvoused in Baltimore and were under the supervision of Donald W. Bogert, Assistant Engineer in Charge, Baltimore, Maryland.

The first eleven search and seizures were executed at approximately 7:00 AM with the remaining eight

executed immediately after. The Baltimore FCC Office is currently conducting in depth inventory of all the equipment and is making technical measurements on each piece of equipment seized to determine the exact frequency range and other technical peculiarities of the equipment. Also, serial numbers on each piece of equipment are being checked through the local authorities in an effort to determine if any of the equipment has been reported stolen. Various station records confiscated are also being scrutinized closely in an effort to ascertain the identity of every individual who may be involved in such illegal operation and where the alleged illegal equipment was purchased.

CB Usage Tips From S9

(CUT OUT & PLACE AT OPERATING POSITION)

Preferred & Designated Channels

- Channel 8 Agricultural operations
- Channel 9 Emergencies only
- Channel 13 Maritime
- Channel 16 Single Sideband only
- Channel 18 Single Sideband only
- Channel 19 Trucks/Vehicles in transit*
- Channels 36 thru 40 Single Sideband Only

*Note that in many areas there are also 1 or more additional channels designated and/or normally used for in-transit vehicles, most often Channels 10 and/or 12. This is especially true in metro areas and their suburbs where Interstate Highways are on 19 and secondary roads such as parkways are on alternate channels. It is not the practice for mobile units on such channels to request breaks. Base stations are requested to avoid using all area in-transit vehicle channels in order to permit their full, free, unobstructed and exclusive use by in-transit vehicles. "Channel Monitors" are neither required nor desired on in-transit channels and are requested to honor any in-transit channels which may have been so designated in local areas by the operators by means of their customary and general usage habits.

Those operators who feel the need to function in CB by establishing themselves as "Channel Monitors" should not expect to monitor or control distant stations which are being received at S-3 strength or lower. They should also be aware of the fact that even those local stations in their area may not wish to avail themselves of their services; all stations having

free access to the channels may elect to bypass the monitor should they wish to do so. Those who attempt to pass themselves off as "Channel Monitors" as a ploy to hog the channel for their own purposes should expect to be ignored by most stations. Those monitors who are successful are those with a good signal and good ears, who earn the respect of other operators by keeping their own transmissions as brief as possible, by giving up their own rights to hold conversations while acting as monitor. ALL transmissions from the monitoring station should consist solely of acknowledging breakers who wish to use the channel, and NOTHING more. During busy periods monitors should deny requests for 10-36's and radio checks on their channel.

Those seeking 10-36's should be encouraged and instructed in the art of telling time by means of wristwatch, clock, or broadcast radio station. Those whose primary interest in CB is chucking carriers and/or playing music are requested to consider the pleasures and benefits to be derived from finger painting and shock therapy, respectively.

Stations using power mikes should be cautious that their audio levels are set to a level which will not cause voice distortion, over modulation, or splasher on adjacent channels.

Single Sideband stations generally operate on Channels 16, 18, 36, 37, 38, 39, and 40, although this may vary in specific areas. Stations using standard AM transmission are requested to avoid use of local Sideband channels, likewise Sidebanders are requested to confine their transmissions to those channels established locally for their use.

CURE THOSE T.V. JEEBIES!

(from page 33)

recorded that there have been instances of TVI complaints which resulted when one neighbor was simply hoping to avenge an old grudge against another. The FCC has also turned up instances where the problem was never even brought to the attention of the CB'er suspected of causing the problem.

The FCC can take action only when it finds that the CB transmitter is not operating properly, or has a linear, or an antenna which is too high. They can fine a CB'er \$50 for each violation if not corrected in 10 days.

Some CB operators have found that there is no other way to stay on a friendly basis with their neighbors than to limit their operating by staying off the air during prime viewing hours, say 8 to 11:30 P.M.

Before you get to that stage, try some of the tricks we've described here—the situation might not be as hopeless as you imagined!

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THE HAM BANDER

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PART 2 OF A SERIES



By Lee Aurick, KNE7802, K2LS

AT the conclusion of the previous session we had covered seven letters of the alphabet and started to learn the c.w. symbols for them.

Key Adjustment

It was suggested that you obtain a simple code-practice oscillator and a key. If you've been practicing you should really have a lock on those first few letters. The speed of 5-words-per-minute required for the Novice examination is not demanding as far as key adjustment is concerned, but it will be helpful if you observe these two simple precautions: 1) The screw adjustments at each side of the key (called trunnions) should be set so that the key lever moves up and down freely. It should not bind, nor should there be sideways "slop" in the key; 2) The spacing between the key contacts is largely a matter of personal preference, and will get closer as you improve your technique. For now, a spacing about the thickness of a dime should be just about right. The forearm, up to the elbow, should rest comfortably on the table. Move the entire forearm, not just the wrist. The key "button" should be held loosely between the thumb and the first two fingers.

All The Alphabet

In two easy steps, we will now take up the remainder of the alphabet. The first group of six letters starts with either a dit or a dah, and then continues to add additional dits or dahs.

Practice should continue, as before, by saying the letters to yourself at first and then sending them on the combination key and oscillator. Try saying them and sending them in groups of three.

The remaining thirteen letters are composed of simple combinations some of which just replace the dits with dahs, and dahs with dits. Some add a dit or a dah, and some are just turned around, front to back.

Because of their similarity, I suppose,

Chart I

A	ditdah
W	ditdahdah
J	ditdahdahdah
N	dahdit
D	dahditdit
B	dahditditdit

Chart 1—Six more letters in two easy to learn groups.

F and L and Q and Y are among the more difficult to learn. There is really no reason for this, its just the way it is.

As you can see, there is nothing difficult or mysterious about learning c.w. It is purely, and simply, a matter of practice. To some it comes more easily than others, but the only people I've known who complained that they couldn't learn c.w., were people who, in my opinion, were not sufficiently motivated to practice enough to learn it. I have yet to meet someone who wanted to learn c.w. who could not, with practice, master it sufficiently to pass the Novice exam.

Chart II

X	dahditditdah
P	ditdahdahdit
U	ditditdah
V	ditditditdah
G	dahdahdit
Z	dahdahditdit
Q	dahdahditdah
Y	dahditdahdah
L	ditdahditdit
F	ditditdahdit
K	dahditdah
R	ditdahdit
C	dahditdahdit

Chart 2—The remaining thirteen letters of the alphabet arranged in groups to aid learning.

While we're on the subject, this is perhaps the time to mention a few more tips on learning c.w. Practice only about thirty minutes at a time—certainly no more than forty-five. At this point, while the effort in learning c.w. is great enough to tangle your brains, practice times should be kept short. Once the fatigue point has been reached, you are at saturation, and continued practice will produce nothing in the way of improvement.

While driving or walking, develop the habit of "sending" signs, billboards and truck lettering silently to yourself. It is in this way that c.w. becomes an unconscious means of communication, and just as natural to you as your native language. After all, this is the way we all learned to read and write.

As an aid to learning the last thirteen letters, and to help get the "feel" as to how they sound, make up little sentences such as: "I will be me" (ditdahditdit-L). "If it makes it" (ditditdahdit-F), "How long it takes" (dahdahditdah-Q), and "Try to run hard" dahditdah dah-Y.

The sentences should be said with a slight emphasis on the underlined words—the dahs.

These are only suggestions, and you may feel more comfortable with some other combinations of words that will be more meaningful to you. Whatever words you choose, whenever the dit and dah combination is sent, it will be just like someone talking to you. You'll recognize it instantly.

You'll note that "C" stands alone. And so it does. There isn't any combination that is related to "C", and please don't ever think of it as being two "N's" run together. If you do, that's what you'll wind up sending, two N's.

As you progress, and if you are fortunate in having someone with whom you can practice, have him send the letters at a fast enough speed to "push" you a bit. This is the only way we progress in anything, and this will keep you on a constantly improving spiral upward. It also makes c.w. sound very slow when

you drop back to a slower speed, and this, in itself, helps to build confidence. Each letter should be sent in about a second, regardless of the code speed. The space *between* letters may be adjusted to the rate of speed desired. Remember, five letters per word, on the average, for a total of twenty-five letters per minute, is a c.w. speed of five words-per-minute.

Numbers and Punctuation

Though numbers and punctuation are not required for the Novice receiving test, you may be required to send some of them on the sending test. It's best to be prepared. The numbers are simple, and they sound like nothing else in c.w. The punctuation marks you should know are few in number, and as with the numbers, you'll need them when you get on the air. The numbers are all composed of five dits or dahs, in contrast with the maximum of four dits or dahs for letters of the alphabet. The first five numbers all start with dits. The next five, including zero, start with dahs. Zero is written 0 to distinguish it from the letter O, and is so used by radio operators throughout the world.

Chart III

- 1—ditdahdahdahdah
- 2—ditditdahdahdah
- 3—ditditditdahdah
- 4—ditditditditdah
- 5—ditditditditdit

- 6—dahditditditdit
- 7—dahdahditditdit
- 8—dahdahdahditdit
- 9—dahdahdahdahdit
- 0—dahdahdahdahdah

Chart 3—The ten digits and their c.w. symbols.

See how a dit is added in front, and a dah removed at the end, of each of the first five numbers. Similarly, a dah is added in front, and a dit removed at the end, in the next five numbers. Numbers have a distinctive sound all their own, and each amateur call sign has one number as a part of it. You will



This Yaesu high-frequency transceiver is one of a growing number of very sophisticated medium power pieces of equipment designed for amateurs who want the utmost in operating convenience.

want to be able to know numbers because, in the U.S., the country is divided into ten call areas and stations can be identified as to approximate geographical location by this number. It will, of course, be necessary to know numbers, and to send and receive them, if you are to be able to call a station, and to know who is calling you.

Punctuation, as with numbers, is something that you will need to know to be able to communicate. As we have seen, the letters of the alphabet are composed of a maximum of four dits, dahs or combinations of both. The numbers are composed of five of one, or a combination of both. The symbols used for punctuation are even more distinctive in that they are all composed of combinations of six dits or dahs. There are many of them, but three will get you by and they are about the only ones used by amateurs. The bar above the letters means that the letters are run together without space between them.

CHART IV

- Period (AAA) ditdahditdahditdah
- Comma (MIM) dahdahditditdahdah
- Question Mark (IMI) ditditdahdahditdit

Chart 4—The three principal punctuation symbols used by amateurs.



Clegg makes several pieces of gear for the VHF amateur. This synthesized 2-meter transceiver is capable of operating on 1000 different channels.

Operating Symbols

In addition to the alphabet, numbers and punctuation, there is just one more area in which you will need experience to make you a real c.w. operator. Operating Symbols are essential. They are a form of shorthand and are used to communicate an entire *idea* to the other operator who may be thousands of miles away. There are ten of them, and there is really no shortcut to learning how they sound. However, there are little ways to remember most of them, and I'll try to give you those tips here.

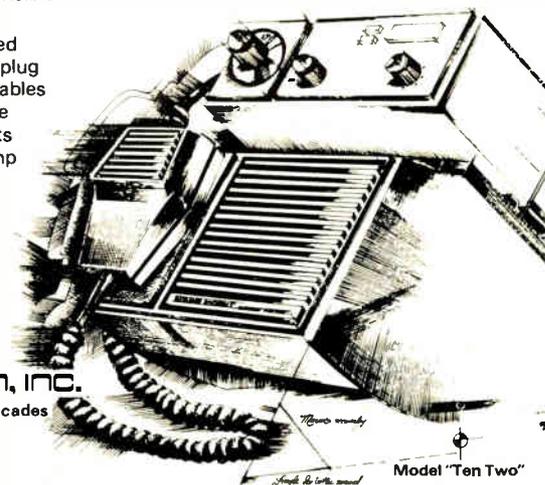
In calling another amateur station, first his call letters are sent then, before you send your call letters, and to indicate that the call letters of the send-
(continued)

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THE HAMBANDER (continued)

ing station are about to be sent, you send the letters DE. This is French for "from", and is used throughout the world. It is not run together like the other operating symbols, but distinctly, as DE (dahditdit dit).

To indicate that a message or transmission has been finished the symbol AR is sent; just before the call letters. The bar indicates that the letters are run together. It sounds like ditdahditdahdit. Since you are expecting a reply transmission from the other station, it might help to use a memory recall device such as "Any Reply?"

When you have finished all the transmissions to a particular station, and will be signing off with that station, the symbol SK is sent to tell him that communication has been concluded. It is sent ditditditdahditdah. You may think of it as telling him to "Stop Keying".

Say you are in the middle of a transmission and are interrupted by the telephone or doorbell. One little symbol will tell the operator at the other end to wait. It is AS, and is sent ditdahditditdit. You may even wish to send a number after the AS to indicate the number of minutes you are asking him to wait. It could be helpful to put this in your memory bank as "All Stop".

At the end of each transmission, the last symbol to be sent is the one which invites the other fellow to start sending. It is just the letter K. I think of it as telling the other station to start "Keying".

In the course of your operating you will make an error. Now the fellow at the other end doesn't know this. For all he knows you may be sending some unusual word that he hasn't yet had a chance to recognize. OK. You blew it. However, starting over and sending the letter correctly now only adds to the confusion. He'll never recognize the word. What to do. Just "fess up" to the fact that you made an error by sending the Error sign—eight dits. Then, go back and send the last word that you sent correctly. This way, the other operator will wind up with a correct word on his paper, followed by a busted-up word, the error sign, and the last correct word, again. He will know that he hasn't missed anything, and will know that you are once again ready with that flawless "fist". Every operator makes a boo-boo once in a while. Don't try to hide it.

I'll bet there is one you'll recognize. When you have received correctly a message, or an idea, from the other operator, just send the letter R. It stands for "Received", and it is why we all say "Roger" on voice, to indicate "What you have sent is understood".

Roger was once used as the phonetic word for R.

It will sometimes be necessary to send a fraction bar, particularly if you are trying to tell someone you live 2/3 of a mile up from the crossroads. The symbol is XE and is sent dahditditdahdit, all run together. It would be sent between the two and the three.

Amateurs use very little punctuation in typical conversations, except when they are actually sending a message that is to be delivered to someone else. This is called "record copy". Generally, to indicate a break between thoughts, the "Double Dash" or break sign is sent. This is BT, and sounds like dahditditditdah. You'll hear it often on the ham bands. Amateurs use it instead of period in general communications. Store it in your memory as "Between Thoughts".

The Attention signal is usually sent at the beginning of a transmission to get the other stations attention, and so that he can identify you from among a host of other stations that may be on the same frequency. It is KA. It sounds like dahditdahditdah. Perhaps you'll find it easy to remember if you think of it as, 'I'm Keying. Attention.

Chart V

From (DE)	dahditdit dit
End of message (AR)	ditdahditdahdit
End of communication (SK)	ditditditdahditdah
Wait AS	ditdahditditdit
Invitation to transmit (K)	dahditdah
Error (8 E's)	ditditditditditditditdit
Received OK (R)	ditdahdit
Fraction bar (XE)	dahditditdahdit
Double dash (break) (BT)	dahditditditdah
Attention (KA)	dahditdahditdah

Chart 5—The ten Operating Symbols most used in amateur radio communication.

That's all there is to c.w., and I promise there will be nothing else new to throw at you in the way of symbols. Future lessons will deal with some review, and more suggestions on how to improve you c.w. speed and operating proficiency, but you now have enough to pass the Novice c.w. test. The rest is up to you, as far as learning c.w. is concerned. There is only one way. It's called practice.

Types of Amateur Operating

Perhaps the most common form of amateur communication could be described as "Rag-Chewing". These communications are sometimes serious,

sometimes just for the fun of talking to another human being at a distance. They could cover just about any topic under the sun, and usually do. They could be technical discussions of equipment, but just as often they will be about some activity other than ham radio, such as tennis, chess, fishing or, of course, the weather. In any event, rag chewing is conducted on every mode of emission available to amateurs. Some of them are familiar to you, such as a.m. and s.s.b, but this is only the beginning. Other modes include SSTV (slow-scan TV), RTTY (radioteletype), and f.m. (frequency modulation).

Perhaps the next activity which occupies amateurs the most is the constant search for awards. There must be thousands of them, but honestly, I never counted them. Of course, all modes are used, and the awards include



The Murch ultimate transmatch is a sophisticated antenna tuner. It helps to tame those bad standing waves.

those for Worked All Continents" (6), Worked All Zones (40), DXCC (working and confirming contact with one hundred foreign countries), Worked All States, Worked All Koekuck (contacting at least five amateurs in Koekuck or Sheboygan), Worked The British Empire (contacts confirmed with British possessions on five continents), etc.

Thousands of amateurs "chase DX" as their main interest. The D stands for distance, and the X for unknown. DX generally means contacting someone outside the U.S. The world-wide leaders in country chasing have totals approaching three-hundred and seventy-five countries. Of course many of these "countries" have no resident amateur population, or are completely uninhabited. Each year, many DXpeditions, as they are called, are mounted to put such remote spots on the air. The amateurs involved spend substantial amounts of money and time, and endure physical danger and great discomfort to have the thrill of putting these remote areas of the world on the amateur radio map.

Not all amateurs are interested in making contacts in the "normal" fash-

ion. A growing band of experimenters are now communicating daily by bouncing signals off the moon, and by relaying their transmissions through one of the OSCAR satellites. The U.S. Air Force has launched seven OSCAR'S (Orbiting Sattelite Carrying Amateur Radio) for a dedicated group of amateurs which includes individuals from many countries.

In this day of high-powered linears, it is refreshing to find some amateurs who delight in making contacts, sometimes half-a-world-away, on as little as 1 watt of power. This is called QRP (reduced power) communications, and the real enthusiasts often have long-distance contacts with only a few *thousandths* of a watt.

It would take a book (perhaps several) to discuss every phase of amateur radio. It is a truly diversified hobby/service, and each amateur pursues the particular niche which interests him (or her). The feminine role in amateur radio has been growing over the years, as in so many other activities, and the YL's (Young Ladies) have their own nets, columns in the amateur journals, their own awards, and even their own national organization, The Young Ladies Radio League (YLRL).

We shall discuss other activities as they come up, but for now, let's start on the theory part of the preparation for the Novice license.

Introduction to The Written Exam

The written part of the Novice exam is divided into nine separate areas. These are:

- 1) Rules and Regulations
- 2) Radio Phenomena
- 3) Operating Procedures
- 4) Emission Characteristics
- 5) Electrical Principles
- 6) Practical Circuits
- 7) Circuit Components
- 8) Antennas and Transmission Lines
- 9) Radio Communication Practices

The Novice written exam is only twenty questions and each one is multiple choice. On the answer paper, provided by the FCC, you are required to make a dash opposite the letter you choose as correct for each question.

We shall endeavor to discuss at least one question in each of the nine areas during each lesson.

Rules and Regulations

For how long is a Novice license valid?

- a) 3 years
- b) 5 years
- c) 2 years
- d) indefinitely
- e) 1 year

The correct answer is b). Recently,



The Alpha 77D is a linear-to-end-all-linears. It is capable of 4kW p.e.p. input, and may be heard on all the high frequency amateur bands.

the term of a Novice class license was increased from two years to five.

Radio Phenomena

On which band or bands of frequencies assigned to Novice operators would long distance communication at night normally be expected to be most favorable?

- a) 10 meters
- b) 15 meters
- c) 40 and 80 meters
- d) 2 meters
- e) 20 meters

The correct answer is c). Novice operators have frequency assignments in the 10-meter band (28,100-28,200kHz), the 15-meter band (21,100-21,200kHz), the 40-meter band (7,100-7,150kHz), and the 80-meter band (3,700-3,750kHz). The 10- and 15-meter bands may normally be expected to produce the longest distance communications during the daytime. The 2- and 20-meter bands are not available to Novices.

Operating Procedures

The "Q" signal "QRM" generally means:

- a) A transmission is experiencing interference.
- b) A frequency is varying.
- c) A reply is requested on a certain frequency.
- d) The sending speed is too fast.
- e) The previous message is to be repeated.

The correct answer is a). "Q" signals are three-letter abbreviations, all starting with the letter Q, which have been adopted by the International Telecommunications Union. The three-letter Q signals have standard meanings understood throughout the world and permit radio operators to exchange communications, even where there is no common language, and with a great saving in transmission time. We shall discuss these in subsequent lessons.

(continued)

THE HAMBANDER (continued)

Emission Characteristics

What is meant by A1 emission?

- Single-sideband
- a.m. telephony
- controlled carrier operation
- on-off keying
- first-class signals

The correct answer is d). A1, as used in the amateur rules, identifies amplitude-modulated keying without the addition of modulating audio frequencies. In other words, there is no intelligence, such as voice, impressed upon the signal. The carrier itself is being turned on and off by the key.

Electrical Principles

Ohm's Law expresses the relationship in electrical circuits of voltage, resistance and

- impedance
- capacitance
- inductance
- reactance
- current

The correct answer is e). Ohm's Law defines a relationship that will give you the unknown value for either voltage, current, or resistance, when two of them are known. Voltage is known variously as potential, and electromotive force. In Ohm's Law it is the E. Current,

measured in amperes (A) and milli-amperes (thousandths of an ampere—mA) appears in the Law as I. The R is resistance, measured in ohms. The relationship may be expressed in several ways, to solve for whatever is unknown. For example: Voltage unknown, $E = I \cdot R$; current unknown, $I = E/R$; Resistance unknown, $R = E/I$. Power (watts) may also be determined if the voltage and current are known, $P = E \cdot I$. The dot means that the two terms are multiplied by each other.

Practical Circuits

A basic radio transmitter to be used at a Novice station would not include

- an oscillator stage
- a frequency multiplier stage
- a detector stage
- tuning and loading controls
- a final amplifier stage

The correct answer is c). Did you get tripped up by this one? Did you overlook the word "not". It pays to read each question thoroughly before putting pencil to paper. The FCC isn't trying to trick you, but they do want to keep you from guessing at the answers. A detector, of course, is a part of a receiver.

Circuit Components

An ammeter is used to measure

- voltage
- resistance
- current
- transconductance
- impedance

The correct answer is c). Current is measured in amperes, milliamperes (thousandths of an ampere, and micro-amperes (millionths of an ampere), and the devices on which it is measured are known as ammeters, milliammeters, and microammeters.



Amateurs are forever wandering about the world to put uninhabited places on the air.

This is the only way to get on to Navassa Island.

Antennas and Transmission Lines

An antenna 66-feet long would be one-half wavelength long when used on what Novice band?

- the 15-meter band
- the 10-meter band
- the 80-meter band
- the 40-meter band
- none of the above

The correct answer is d). The length in feet, of a one-half wavelength antenna for any frequency may be determined from the formula:

$$\text{Length in feet} = \frac{468}{\text{frequency (MHz)}}$$

Dividing 468, in turn, by 3.7 MHz (80-meters), 7.1 MHz (40-meters), 21.1 MHz (15-meters), and 28.1 MHz (10-meters) provides us with lengths of 126 feet, 66 feet, 22 feet, and 17 feet, respectively.

Radio Communication Practices

What is the power input to a final amplifier tube of a Novice transmitter, discounting filament or cathode power, when operated under these conditions:

- Driving Power —1 watt
- Plate voltage —900 volts
- Plate Current —250 milliamperes
- Screen Voltage —190 volts
- Screen Current —15 milliamperes

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- a) 285 watts
- b) 22.88 watts
- c) 225 watts
- d) 228.85 watts
- e) 2,288.5 watts

The correct answer is d). The total power applied to a tube is the sum of the plate power, screen power and driving power. In this instance, it is 225 watts plate power (900 volts times 0.250 ampere), 2.85 watts screen power (190 volts times 0.015 ampere), and the 1 watt drive power for a total of 228.85 watts. This is well within the new maximum power limit of 250 watts authorized Novice stations.

Next, we'll discuss more of the type of questions you may expect to see on the Novice exam, as well as introduce you to the Q signals used by amateurs. For now, it's practice and more practice.
73, W2LE

QUESTIONS FROM READERS

Q: One friend of mine who has a Novice license has an N in his call, and another friend, who just received his Novice license, has a WB4 prefix, but no letter N in his call. Why the difference?

A: The FCC stopped issuing Novice calls with the identifying letter N in late '76. Your friend's new license is also good for five years, and can be renewed, too. The friend with the N in his call will, in a short time, receive a *new* call from the FCC, that does not have the N.

Q: As a Novice, how high can I put my antenna in the air?

A: This question is deceptively simple, but the answer is extremely complicated. The FCC says 200 feet, before you have to file an environmental impact study, and fill out a host of forms, providing you don't live near an airport. If you live near an airport, there is a special formula which applies. However, from a practical viewpoint, even if money is no object, local zoning ordinances can have the greatest effect. In some few instances, ordinances attempt to prohibit antennas of any kind. Sometimes restrictive covenants, which are a part of a deed, act to prohibit towers. Before ordering your tower, check with your local building inspector, and check your deed.

Q: Where can I get more information about all the things that are happening in amateur radio?

A: The easiest place is your local newsstand. Pick up a copy of CQ—The Radio Amateur's Journal, or write to CQ, 14 Vanderventer Ave., Port Washington, NY 11050. A subscription for one year—12 issues—is \$7.50.

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Applicants who file for a CB license and use the new CB zip code 17326 will find the wait for their licenses is significantly reduced.

The new zip code, assigned in early May, 1976, enables the Post Office to sort applications in regional mail centers. This results in pre-sorted applications arriving at the Gettysburg office, and thereby eliminates the need for the FCC to sort such mail. Thus, licenses can be processed more promptly.

The proper address for CB applications is:

FCC
Gettysburg, Pa. 17326

It should be noted that the new zip code is to be used **only** for **completed** CB license applications. Other types of mail sent to that particular number might be delayed because it was not addressed correctly. All **other** (non-CB) applications should be addressed to:

FCC
Gettysburg, Pa. 17325

CB LICENSES REISSUED

Despite the FCC's quickie processing ZIP code, they have nevertheless determined that several thousand Citizens Radio Service licenses issued in 1976 may never have been received by applicants! The affected licenses are:

Approximate Date Application was sent to the Commission	First Number in Applicant's Zip Code
December 1975	6, 7, 8
January 1976, early February 1976	8, 9
late February 1976, March 1976	2, 3, 4, 6, 7, 8
April	0, 1, 4

The FCC reprinted entire blocks of

licenses to insure that all licensees properly receive them. Should any licensees receive a duplicate license due to this reissuance, the duplicate should be disregarded.

**CLASS D FREQUENCY EXPANSION
UPHELD BY FCC**

The FCC, with one exception, upheld its July 27 action increasing from 23 to 40, the number of channels available to the Class D Citizens Radio Service, and making other changes in its rules governing the Class D service.

In order to ensure that as many Class D transmitters as possible meet the new 60 dB harmonic suppression standards set out in the July 27 action, the Commission revised its rules to require that the manufacture of all Class D transmitter models type accepted prior to September 10, 1976, terminate by August 1, 1977, and the marketing of such transmitters terminate by January 1, 1978.

Should a manufacturer desire to continue to manufacture and market Class D transmitters type accepted prior to September 10, 1976, the Commission said the manufacturer could assign new model numbers and submit the transmitters to the FCC prior to August 1, 1977, for re-type acceptance under the new technical standards.

The Association of Maximum Service Telecasters, Incorporated (MST) and the American Broadcasting Companies, Incorporated (ABC) sought reconsideration of the July 27 action.

They primarily complained that the 60 dB level of harmonic suppression required of Class D transmitters type accepted after September 10 was insufficient to protect television broadcasters and viewers from interference. They sought a more stringent radiation standard around 105 dB. MST asked that, in any event, all Class D transmitters be required to meet the new harmonic suppression standard regardless of the date of type acceptance.

The FCC said its decision to require 60 dB of harmonic suppression was

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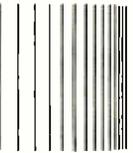
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based on its appraisal that the public interest required an immediate allocation of additional frequencies to the Class D Service, and that to require more than 60 dB of harmonic suppression for new Class D transmitters would unnecessarily delay frequency expansion, because manufacturers would be forced to redesign their equipment to meet any tighter specifications.

Although it was true that harmonic radiation from some Class D transmitters causes television interference, the majority of interference complaints re-

ceived by the FCC result directly from poor television receiver design, lack of adequate filtering in television receivers now on the market and inability of television receivers to reject adequately unwanted or adjacent channel signals.

The FCC added that the adoption of the 60 dB limit was an interim measure, and that it intended to issue a rulemaking notice within the next several weeks looking toward the adoption of a more stringent harmonic suppression standard, on the order of approximately 100 dB.

LICENSE REVOKED IN WHITTIER, CALIF.

FCC Chief Administrative Law Judge Chester F. Naumowicz Jr., in an initial decision released today, has revoked the license of Volkert Lories of Whittier, Calif., for his Citizens Band radio station KWM-7408.

By order released December 30, 1975, Lories was directed to show cause why his license should not be revoked for violations of the Citizens Band rules—Part 95.

Hearing was held in Los Angeles on June 21, 1976, and the record was closed on that date.

Judge Naumowicz said that on August 6, 1975, two FCC engineers monitored a station in the Whittier area that was in violation of Section 95.95(c) of the rules. (That rule requires that all transmissions from each unit of a citizens radio station be identified by its assigned call sign at the beginning and end of each transmission, or series of transmissions but at least at intervals not to exceed ten minutes.)

The judge said the engineers subsequently identified the operator as Lories. Because the characteristics of the signal caused the engineers to believe that the station was being operated with unlawful power, they requested permission to inspect the station to prove or disprove that belief, Judge Naumowicz said. However, he said, Lories refused in violation of Section 95.103 of the rules.

Judge Naumowicz noted that Lories' defense for violation of Section 95.95 (c) was that he failed to understand his obligation to transmit call signs because the rule is unclear and confusing.

In this regard, the judge said he was inclined to agree that the rule is ambiguous and fails to state with precision the manner in which the Commission intends to regulate. Nevertheless, he said, no matter how the rule is read, it requires call sign identification when terminating transmissions. He found that on two occasions during the monitoring Lories concluded his transmission for a significant period of time but on neither occasion did he identify by his call sign.

Therefore, Judge Naumowicz said no matter how the rule is read, Lories violated a portion of it which is unambiguous and easy to understand, and thus concluded that the violation of Section 95.95(c) had been proven.

Lories' defense to the violation of Section 95.103 was rooted in semantics, Judge Naumowicz said. The judge noted that Lories contended that because his license speaks of the necessity to make his station available for inspection on "request," and because "request" implies a right to refuse, he



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had no absolute obligation to permit inspection.

What Lolie failed to perceive, Judge Naumowicz said, was that the Commission had already accepted his reasoning, pointing out that when he refused to permit inspection the engineers did not attempt to force their way in. Thus, Lolie's implied right to refuse their "request" was honored, the judge said.

However, he said, when Lolie chose to exercise his implied right to refuse the request for inspection he chose to violate the rule, since the rule requires that the licensee must exercise his discretion in favor of permitting inspection. Therefore, Judge Naumowicz concluded that Lolie knowingly and willfully violated Section 95.103.

These violations, he said, were serious and could not be condoned or excused. Judge Naumowicz pointed out that unless Commission engineers can conduct an immediate inspection when they have probable cause to believe that a station is being used in an unlawful manner, the FCC's power to regulate in the public interest would be gravely threatened. Therefore, he concluded that the public interest would be best served by the revocation of Lolie's license.

CRACKDOWN ON OPERATORS IN BIRMINGHAM, ALA.

A crackdown on illegal operations of CB stations operators in Tuscaloosa, Ala., has been instituted by Wayman G. Sherrer, U.S. Attorney, Northern District of Alabama.

Under the direction of Assistant U.S. Attorney, Bill L. Barnett, Commission agents from the Atlanta District office and Powder Springs, Ga., Monitoring Station have conducted extensive investigations into the illegal operation of power (linear) amplifiers and overpower transmitters which interfered with home entertainment devices of neighbors of the operators and with other citizens band stations.

Search warrants for the illegal transmitters were issued by U.S. Magistrate R. Macey Taylor and were served by U.S. Marshals, accompanied by FCC agents on September 23 and 24, 1976. A number of transmitters, receivers, and power (linear) amplifiers have been seized.

The Communications Act of 1934, as amended, provides a maximum penalty of \$500.00 per day for the operator of a station violating FCC Regulations.

SHOW CAUSE ORDER IN ORANGEBURG, S.C., CB CASE DISMISSED

The FCC Review Board has dismissed an order directing Donald Ham-

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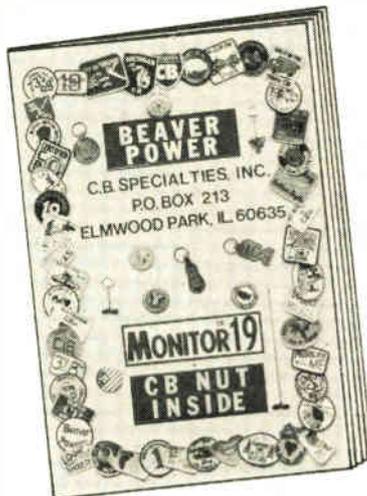
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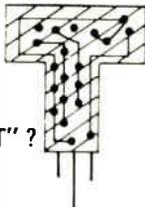
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S9 # 7

mond of Orangeburg, S.C., to show cause why his license for Citizens Band radio station KGP-8522 should not be revoked.

According to the show cause order issued January 21, 1975, Hammond's station had been operated in violation of numerous operating rules on October 16, 1974.

The operating violations included: failure to identify the station by its assigned call sign (Section 95.95(c)); transmission of communications relating to signal strength, testing, adjustments or capabilities of radio equipment (Section 95.83(a)(13)); failure to observe the five minute silent period between communications (Section 95.91 (b)); and use of an intrastation frequency for interstation communications (Section 95.41(d)(2)).

The order also cited Hammond for willfully refusing to permit FCC representatives to inspect his station on October 19, 1974, in violation of Section 95.103 of the rules.

Hearing was held on November 10, 1975, before FCC Administrative Law Judge Ernest Nash.

In an initial decision released last February 12, Judge Nash concluded that while the Safety and Special Radio Services Bureau had established that a conversation emanating from Hammond's single-family home involved several operating violations, the Bureau failed to sustain its burden of proving that Hammond was the individual who was transmitting on October 16, 1974.

The judge also concluded that the Bureau failed to demonstrate that the violations, even if committed by Hammond, were willful and that, in the absence of willfulness, revocation was not warranted.

Judge Nash further found that Hammond's October 19, 1974, refusal to allow inspection was neither willful nor so unreasonable as to require revocation.

While affirming the judge's ultimate conclusion that revocation was not warranted in this case, the Review Board concluded, unlike the judge, that the Bureau had proved the operating violations were committed by Hammond, that these violations were willful and that refusal to permit inspection of the station was willful.

The Review Board said the record evidence clearly established that the transmissions monitored and recorded by FCC engineers on October 16, 1974, emanated from Hammond's dwelling and that the person responsible for the transmissions failed to observe several operating requirements.

In view of these findings, the Board said it must be determined whether



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Hammond committed the operating violations and, if so, whether the violations were willful. While there was no direct evidence to show that Hammond was operating the station when the violations occurred, the Board said the undisputed circumstantial evidence relied on by the Bureau was sufficient to persuade it that Hammond was, in fact, the operator.

Among other things, the Board said, Hammond's station was identified as the source of the violations; Hammond testified that only he and his wife resided in the single-family house on the date in question; the operator was identified as a married man; Hammond never denied making the transmissions; and Hammond offered no explanation of who else could have made the transmissions.

Since Hammond submitted no countervailing testimony or other evidence to establish that he was or could not have been operating the station at the relevant time, the Review Board said it could reach no other conclusion other than that Hammond was the operator of station KGP-8522 on October 16, 1974.

The Board also found that Hammond's operating violations were willful since it was clear that he knew that he was doing the acts in question. (The word "willfully" as used in Section 503(b) of the Communications Act dealing with forfeitures for broadcast stations "does not require a showing that the licensee knew he was acting wrongfully; it requires only that the Commission establish that the licensee knew that he was doing the acts in question—in short, that the acts were not accidental.")

The next question to be determined, the Board said, was whether Hammond refused to allow Commission engineers to inspect his station in willful violation of Section 95.103 of the rules. In this regard, the Review Board noted that it was undisputed that Hammond refused to permit an inspection of his station and that he continued to refuse inspection even after he was warned that refusal could lead to revocation of his license. Thus, it said, it was clear that Hammond knew he was refusing inspection and that he therefore acted willfully.

The Review Board said that while these findings in other circumstances might warrant revocation, it found strong mitigating factors in this case.

First, it said, Hammond had stated that he was sorry the violations occurred and that they would not be repeated. The Board said this contrition was of some force considering there was no pattern of misconduct.

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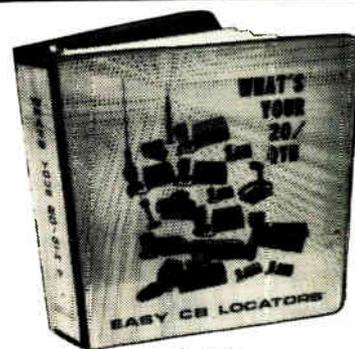
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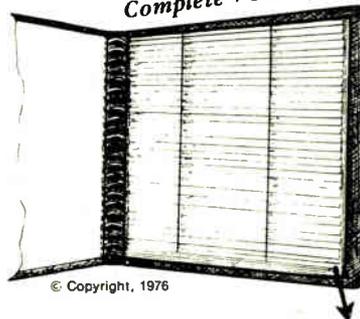
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59

must give some weight to Hammond's explanation for refusing to admit the Commission engineers—that he is a man of mature years who has a serious heart problem, that at the time the engineers arrived he was in a heated discussion with a realtor about the sale of his house, and that he was upset at the time and in no condition to talk to anyone.

Finally, the Board noted that Hammond stated that the only reason he applied for a CB radio was because he had been advised to do so by his doctor due to his health problem.

In view of these mitigating circumstances, the Review Board concluded that the public interest did not require revocation of Hammond's Citizens radio license.

ADVERTISEMENT OF CERTAIN NONAPPROVED RF DEVICES AUTHORIZED

The Commission has further relaxed its rules on the marketing of radio frequency (RF) devices to allow the advertisement of certain equipment which has not yet received FCC approval so long as the advertisement contains a notice that the equipment has, indeed, not been approved and that it may not be sold, offered for sale, leased or offered for lease until approval has been obtained.

(Type acceptance and certification for equipment is granted after a review of representations and measurement data submitted to the FCC by the applicant. Type approval is granted to a manufacturer signifying that a prototype of a particular type of equipment has been tested in the FCC's laboratory and found to comply with all the requirements of the applicable regulations.)

Last March 19, the Commission amended Section 2.803 of its rules to allow the display or showing of non-approved equipment at industry trade shows if it were accompanied by conspicuous notice that the device had not been approved and therefore could not be sold, offered for sale, leased or offered for lease.

Since there have been no abuses or adverse effects from the display amendment, the FCC said it now would relax its rules on advertising to allow manufacturers and merchandisers of RF devices to further test the market acceptability of their products so they may judge whether subsequent or quantity manufacture and ordering would be warranted should the device receive FCC approval.

The Commission emphasized that if a device could not be granted approval under existing FCC rules, then the device does not qualify among those

items eligible for nonapproved advertising. It gave as examples of ineligible items such devices as linear amplifiers for use in the Citizens Radio Service and devices using Class B emission.

(Class B emissions, commonly referred to as "damped waves," are generated by devices that are similar in nature to the spark-gap transmitters used in early radio which have since been banned because of their interference-generating characteristics.)

The FCC said its primary purpose in amending its rules in this fashion is to keep unapproved and offending devices out of the stream of commerce by inviting the public's attention to the fact that many, if not most, of the multitude of RF devices proliferating in the marketplace require scrutiny by the FCC before they can be marketed. It said if RF devices were manufactured without adherence to technical specifications in the FCC rules, such devices seriously could affect, degrade or destroy a wide variety of communications services and other worthwhile uses of the radiofrequency spectrum.

NOTICES OF APPARENT MONETARY FORFEITURE

For willful violation of Section 95.95 (c) of the rules for failure to identify subject radio stations by the assigned call signs.

Saint Petersburg Beach, Florida, Henry J. Hurkmans, \$50, KDJ-4161.

Anaheim, Calif., William T. Evans, \$50, KGU-8213.

Tustin, Calif., Gilbert E. Pennington, \$50, KQU-2293 (former KGP-92680).

The Commission, by its Engineers In Charge, on behalf of the Safety and Special Radio Services Bureau, issued Notices of Apparent Liability to Monetary Forfeiture on various dates to the following radio station licensees in the Citizens Radio Service for willful violation of various sections contained in Part 95 or a repeated violation of Section 1.89 of the Commission's Rules:

Tampa, Florida

Benjamin Adkins, \$50, KTQ-5625.

Jimmy L. Knight, \$50, KFC-7305.

John Silvey, \$50, KXT-5694.

Oshkosh, Wisc., John W. Nelson, \$50, KXN-4236.

Baltimore, Md., Edgar Brooks, \$100, KZI-8030.

Easton, Md., Thomas T. Newman, \$50, KDR-9637.

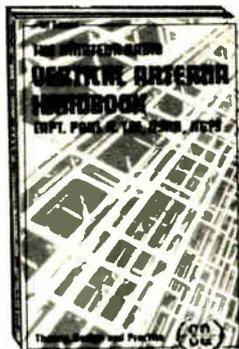
Phoenix, Md., Edgar G. Shelor, Jr., \$50, KSQ-8489.

Fort Myer, Va., Wallace Bliefernack, \$50, KVG-6981.

S. Boston, Mass., Raymond F. Sartre, \$50, KYI-9566.

Ravenna, Ohio, Clarence Gillespie, Jr., \$50, KYC-9913.

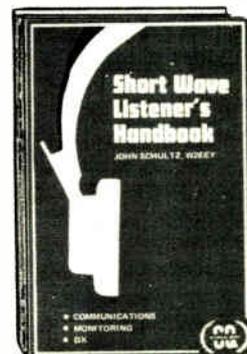
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Davenport, Iowa, Mark C. Belli, \$100, KXP-5766.
Hawthorne, N.J., Manley M. Knouse, Jr., \$100, KSD-0312. (corrected)
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Braymer, Mo., Gary F. Stratton, \$50, KHO-4109.
Blue Hill, Neb., Victor G. Hesman, \$50, KJK-4631.
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\$50, KYV-9230.
 El Paso, Tex., Roger T. Avers, \$100, KJS-6291.
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 Edmonds, Wash., Clifton J. Marcum, \$50, KTY-3949.
 Everett, Washington
 Gregory J. Beech, \$50, KGB-98201.
 Daniel L. Birkhead, \$150, KND-7554.
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 Virgil V. Bennett, \$50, KNH-4290.
 Golowyn O. Gjerding, \$50, KHJ-1158.
 Golowyn O. Gjerding, \$50, KHJ-5445.
 Jack W. McDugle, \$100, KID-1975.
 Mountlake, Wash., Dale R. Smith, \$150, KBC-5855.
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REVOKED

Las Vegas, Nevada, Franklin H. Taylor, licensee of Citizens radio station KEN-3013. Ordered that the license be revoked for violation of various sections of Part 95 of the rules including Section 95.95(c) of the rules by failing to identify its assigned call sign at the beginning and end of each transmission or series of transmissions.

SHOW CAUSE NOTICES

The FCC's Safety and Special Radio Services Bureau ordered the following licensees to show cause why their licenses should not be revoked for violation of Section 1.89 of the rules by failing to respond to official communications.

Redwood City, Calif., Judie L. Pelletier, KXT-8071.
 St. Louis, Mo., Dale F. Ullrich, KYT-6668.



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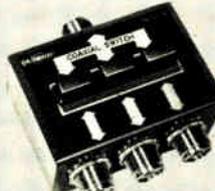
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(continued from page 57)



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For additional information contact: Bob Artigo, Communications Power, Inc., 2407 Charleston Road, Mountain View, CA 94043.



PRE-ASSEMBLED TRUNK MOUNT ANTENNA

Antenna, Incorporated is now shipping its popular Persuader Model 17610 Citizens' Band trunk lip mount antenna in pre-assembled form, a form which will save at least 10 minutes' installation time, announced Randall J. Friedberg, sales manager for the Cleveland-based manufacturer.

In addition, the Persuader Model 17610 now includes the company's in-line coaxial cable connector, designed

to fit through a $\frac{3}{8}$ " hole, previously available only on Antenna, Incorporated display-boxed antennas.

The improvements are offered with no increase in price over the previous unassembled version of the Model 17610, Friedberg said. Suggested resale price of the Persuader is still \$25.95.

The Persuader comes complete with a base loaded antenna, 34-inch 17-7PH stainless steel whip to resist bending and stainless steel impact spring to prevent damage in low clearance areas, as well as 17-feet of coaxial cable with both PL-259 type connector and in-line connector and mount. It is designed to achieve a voltage standing wave ratio of 1.5:1 or less and is fully weatherproof.

The unit is packaged in three pieces: pre-assembled mounting cup and bracket connected to the coaxial cable; loading coil and spring; and whip. The transceiver connector is pre-soldered, and installation requires only a small screwdriver.

"For any installation, whether professional or do-it-yourself, time is the major factor," Friedberg said, "and the Persuader is the fastest type antenna to install other than magnet or rain gutter mounts."

"There's no wire stripping or soldering needed," he said, "and the installer does not have to assemble the mount—which alone saves at least 10 minutes."

The in-line connector also saves time, Friedberg said. With it, the installer has the choice of feeding the cable from the trunk or the passenger compartment, whichever is more convenient.

All Antenna, Incorporated products are manufactured in the United States and are completely tested and inspected before leaving the factory to ensure the highest quality.

For further information on the Model 17610 pre-assembled trunk lip mount antenna and the complete line of Antenna, Incorporated products, contact Randall J. Friedberg, Antenna, Incorporated, 23850 Commerce Park Road, Cleveland, Ohio 44122.

NEW MAGNETIC SIGN KIT

"More QSO's per mile!" That's the boast of Space Cadet Industries for its new line of Mag-Handle™ sign kits. Aimed mainly at CB'ers who are "inspired tinkers", this do-it-yourself product plus a little creative art work yields a handsome magnetic "handle" sign that can be quickly dropped into place and just as quickly removed for storage from the rear or side of most vehicles.

According to Space Cadet Industries, most CB'ers love to tinker with things, and nearly all of them would like a way to display their handle, call letters and monitored channel for on-the-road QSO's in a neat attractive manner. Unfortunately, the cost of heavy, embossed magnetic signs made by commercial sign companies is usually prohibitive. A "Mag-Handle" sign, however, is reasonably priced.

Each kit contains a 6 x 17-in. flexible white 100%



magnetic background strip, and several alphabets of 2-in.-high red and 1-in.-high blue pre-perforated pressure-sensitive vinyl letters.

The purchaser simply designs his own sign on a piece of paper, and then transfers this with the necessary letters to the magnetic background. Ample material for any pictorial design can be recovered from the salvage left over after the letters are lifted from the paper backing.

"Mag-Handle" signs for CB's can be purchased at many retail CB stores, or get details from Space Cadet Industries, P.O. Box 5433, Orange, Cal. 92667.



"TRAPPER" TVI FILTERS

Channel Master has announced the introduction of the "Trapper" line of low-pass TVI filters. Channel Master, a pioneer in MATV and passive filter technology, has designed filters which effectively screen out television interference while passing the CB frequencies, thus eliminating undesirable harmonically-induced TV interference.

Two models are available, either of which can be used on mobile transceivers or base station units. Both models have metal housing for improved shielding and are easy to mount and to connect.

"Trapper 45" is a compact low-pass TVI filter designed for average situations. Attenuation is 45 db at 54 MHz, and 40 db at 81 MHz. Model 5271, suggested retail, \$9.95.

"Trapper 100," super strength, low-pass TVI filter. Designed for severe interference problems. Attenuates 100 db at 54 MHz, and 75 db at 81 MHz. Model 5272, suggested retail, \$14.95.



MINI-SYSTEM SLASHES COST

In three minutes, a new calculator-controlled automatic test system from Hewlett-Packard can fully check out a typical two-channel mobile FM transceiver, CB radio, handi-talkie, or AM transceiver. With capabilities formerly matched only by computer-controlled systems twice its price, the new HP 8950A Transceiver Test System will serve the automatic test needs of such users as transceiver manufacturers, military radio depots, state and large-city communications agencies. Transceivers operating at frequencies from 1 to 1000 MHz and up to 100 watts are covered. This, of course, includes the new 900-MHz mobile FM band, where channel expansion is under way, as well as the well-documented CB radio field.

The new technology that has cut the cost of transceiver auto-testing is the HP Interface Bus (Hewlett-Packard's implementation of IEEE Standard 488). The interface bus makes it possible to use mostly off-the-shelf RF instrumentation, reasonable in price, yet of calibration-lab quality. The 9825A calculator approaches mini-computer speed and program flexibility, provides easy, user-oriented operation, yet saves cost.

Everything in the 8950A menu of test sequences is commanded by the calculator which also refines system findings with stored calibration data. The 8950A tests transmitters at frequencies from 2 to 1000 MHz (receivers, 1 to 1000 MHz) with powers from 0.5 to 100 watts. The available tests include amplitude modulation, FM deviation, audio characteristics including frequency response, sensitivity and total harmonic distortion. Receiver test capabilities include sensitivity tests at 12 dB SINAD or at 20 dB quieting and can also be made at squelch threshold. Variation of test procedures

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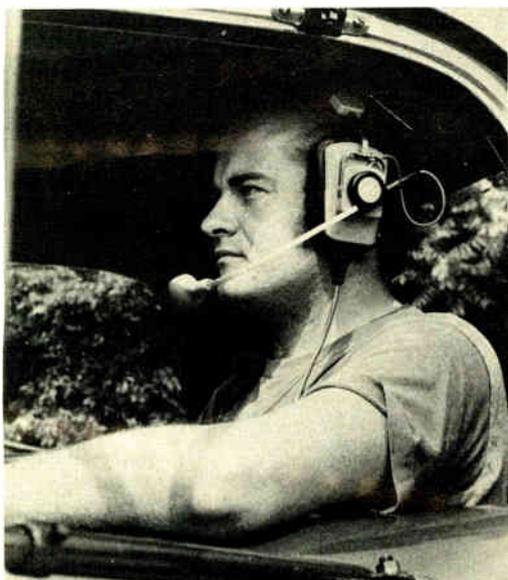
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is possible (e.g. 10 dB SINAD S/N, quieting, etc.) because they are under software control, and are not fixed in firmware or hardware. A special signal switch panel at the operator's console promotes rapid connection to equipment under test. 20 Amps are available to power the transceiver.

Modular demonstration testing routines are supplied. The user writes simple test programs to call on a variety of powerful computation routines, to analyze data, store instructions or data on the built-in data cartridge, print out, or tie to higher-level management data bases. Hardware can be added to extend software applications programs; for example, the calculator could be used to operate a temperature chamber, take if measurements at appropriate times, and deliver a chart of the data.

Price and Delivery. U.S. price of the 8950A, including the calculator and work shelf, is \$58,500. The hard copy printer option is \$3,475 and the optional 11268A work table, is \$790. Current delivery is 14 weeks.

Contact Hewlett Packard, 1501 Page Mill Rd., Palo Alto, CA 94304.



HEADSET

Truck drivers and others working in a noisy environment are now assured of sharp, clear CB reception with the "over the ear" boom mike headset by Telex, the world's leading manufacturer of professional aviation communications equipment.

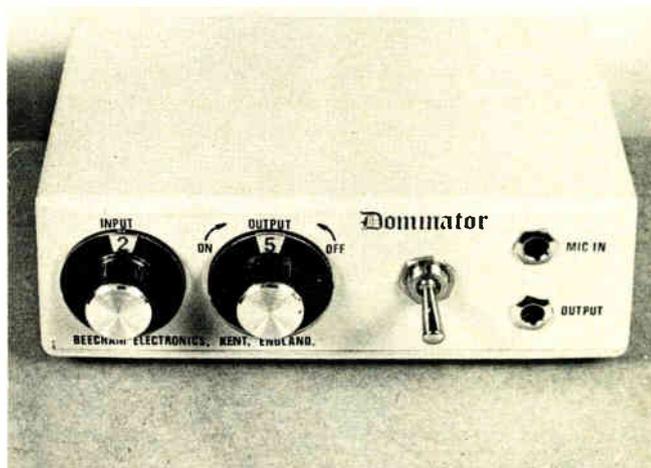
The comfortable foam-cushion earpiece, designed to be worn on either ear, substantially cuts down highway and vehicle noise. At the same time, the single-sided construction enables the operator to remain in contact with his immediate surroundings.

The boom microphone is adjustable for placement directly in front of the lips for transmission and for pivoting out of the way when not in use. The push-to-talk switch is provided with a clothing clip. The power mike has a built-in FET amplifier and operates on a long-life 1.4 volt mercury battery.

An outstanding feature of the CB-1200 is its ready adaptability to match the mike-switching circuitry of any CB transceiver. The conversion is made simply by changing the cord. This can be done by the dealer or by a user himself with some technical ability.

Manufactured in Telex's plants in Minnesota, the headset construction follows the same exacting requirements of aviation headsets. The transducer element assures maximum performance at the widest extremes of temperature.

Contact: Telex Communications, Minneapolis, Minn.



THE DOMINATOR IS HERE

The DOMINATOR is a smashingly effective speech processing unit which is handcrafted in England by Beecham Electronics. Not just a mike amplifier, the DOMINATOR uses sophisticated state-of-the-art plug-in integrated circuits and advanced design to raise the average talk-power of any AM or SSB signal (23 or 40 channel rigs) to a high level. No rig modifications, PPT works normally, simple hookup (battery powered). Switches in or out of circuit.

The DOMINATOR is now available by mail order (only) at \$69.95. It is imported exclusively by RLW Electronics, 100 Industrial Drive-Box 221, Lake Grove, N.Y. 11755.

DUAL CB ANTENNAS FOR CARS

A new set of dual co-phased CB antennas similar to those used on big highway trucks is now available for passenger cars from The Antenna Specialists Co.

The new model, MR312, features unique hatchback/trunk groove mounts for installation between the trunk lid and fenders as well as on the sloping rear deck of hatchback and fastback cars.

Each stainless steel whip is center loaded with a weatherproof, molded coil and measures 53" overall. The set also includes a special phasing harness and connector assembly.

Manufacturer's suggested list price: \$36.95. For further information contact: The Antenna Specialists Co., 12435 Euclid Avenue, Cleveland, Ohio 44106.



DX Korner

Send SWL reports to:

Don Jensen
c/o CB Radio/S9 Magazine
14 Vanderventer Ave.
Port Washington, NY 11050

FOR shortwave listeners, one of the most interesting continents in which to hunt for DX signals is Asia. In the imagination, certainly, and in many cases in reality, there is much that is exotic and exciting in Asia. For the shortwave listener interested in DX as a window to the world of current events Asia is still in the news, although the focus has tended to shift from the Far to the Near and Middle East in the past several years.

There is no one Asia. Asia is diversity. It runs from the Arctic to the southern deserts, from the Ural Mountains, from the border with Europe, thousands of miles to the Pacific Ocean. It makes up one-third of the earth's land mass. Its people are yellow and brown and white who speak numerous languages and dialects.

Nowhere is that multiplicity of language more apparent than on the shortwave bands. But for the beginning SWL, out attention will focus on those shortwave outlets that broadcast in the English language.

We continue our continent-by-continent overview of what you can hear on the shortwave bands with a look at Asia.

Asia's largest country is China. And, despite the alien political philosophy—or perhaps because of it—many DXers find a certain attraction in tuning Radio Peking (though it will never win any prizes for programming!)

A good time to tune for Radio Peking, a time when most U.S. DXers have no trouble hearing it, is between 0000 and 0200 GMT. For the first hour, try 11675, 11945 and 15060 kHz. During the second hour, look on 9940, 11945 and 12055 kHz.

In DXer interest, another popular target is Tokyo's Radio Japan, a station which seems to go out of its way to accomodate shortwave listening fans, particularly with its many gorgeous, full-color QSL cards sent in response to correct reception reports.

You can try for Radio Japan on a number of frequencies, 17725, 15420 and 15195 among them, at 0130

to 0230 GMT. Or in the morning, at 1300 GMT, listen for English on 5990 kHz.

A lesser known and less frequently heard Japanese SWer is NSB, the Nihon Shortwave Broadcasting Co. Ltd., headquartered in Tokyo. West Coast listeners in particular can look for this one with English at 0945 GMT on 3925 kHz.

Another of the major Asian countries is India. Here all broadcasting is controlled by the government's All India Radio. Its English language foreign service program is known as the General Overseas Service and it has been widely reported in North America during the 2045 to 2230 GMT time block on 9525 and 11740 kHz.

Sharing the great Asian subcontinent with India is Pakistan. One of the best times to hear Radio Pakistan in English is from 2100 to 2145 GMT on either 9445 or 11672 kHz.

And Bangladesh, formerly a part of Pakistan, broadcasts its Radio Bangladesh programs in English from Dacca at 1230 GMT on about 15265 kHz.

Moving westward to the part of Asia that is, most often, in the news headlines today, there is Israel. Long a second-rate broadcaster with limited schedules of programs and low powered transmitters, things changed several years ago for Israel. Now the Israel Broadcasting Authority operates several mighty 300 kilowatt shortwave transmitters and is making a definite effort to reach English-speaking audiences in the United States. It is now very easy to tune the IBA's SW programs.

Times and frequencies to try? All right, there's the time period between 2230 and 2300 GMT on 9435, 9815 (said to be the most popular frequency for IBA listeners in the U.S.) and 11625 kHz. At 0500 GMT, try 7412, 9435 or 9815 kHz.

Other countries in this corner of Asia which you can tune for with a good likelihood of success include:

Syria—Radio Damascus can be heard in its English language service from 2030 until 2200 GMT on 9545 kHz.

Turkey—The Voice of Turkey is not a difficult catch for most eastern SWLs, especially between 2200 and 0030 GMT on 9515 kHz. You could also try 11880 or 15165 kHz.

(continued)

Saudi Arabia—The government SW outlet is known as the Broadcasting Station of the Kingdom of Saudi Arabia—BSKSA for short. You can find this one programming in English from 1900 to 2200 GMT on 11855 kHz.

Iran—Though the English programs of Radio Teheran at 2000 GMT are intended for European audiences, they are well heard in North America on 9022 kHz.

Iraq—Radio Baghdad has an hour's worth of English programming daily at 1930 to 2030 GMT. Frequencies to try are 9745 or 9758 kHz.

Heading back toward the Orient, Afghanistan's Radio Kabul is worth a stop en route, especially for west coast listeners who may find English programming at 1400 GMT on 4775 kHz. Listeners west of the Rockies might also be interested in trying for English broadcasts from the Burma Broadcasting Service at 1415 GMT on 5039 kHz.

One of the best bets to hear the city-state of Singapore is 5052 kHz, say during the 1330-1500 GMT time slot. Radio Singapore also uses 11940 kHz.

Sri Lanka, the former Ceylon, has its SLBC, the Sri Lanka Broadcasting Corp., which airs programs in the morning, 1230-1530 GMT, on 7190, 9720 and 15425 kHz.

A couple of out-of-band frequencies are the spots to tune Hanoi's Voice of Vietnam in English. Those frequencies are 10040 and 12035 kHz. Try for this one at 0100, 1000 or 1300 GMT.

Then there are the Koreans, North and South. Radio Pyongyang, the North Korean SW outlet is scheduled at 1000 GMT for an hour on 11535 and 9420 kHz. West coasters may find it on 3560 kHz around 1300 GMT.

South Korea's Radio Korea uses 9635 and 11860 kHz at 1000 GMT; 9640 kHz at 1530 GMT; and 11860 kHz at 1800 GMT.

And to wrap up this selective survey of shortwavery from Asia, here are some more target stations:

Mongolia—This is one of the tougher Asians, particularly if you insist on English programming. Westerners might find Radio Ulan Bator in English at 1200 GMT on 6383 kHz.

Malaysia—the Voice of Malaysia has English programs from 0625 to 0855 GMT on 6100, 6175, 7220, 11900 and 15275 kHz. But probably easier than mainland Malaysia are the stations of Radio Malaysia Sarawak, from the portion of the island of Borneo that is part of Malaysia. RMS is in English at 1100-1230 on 7160 kHz and at 1400 GMT onward on 9605 kHz.

Philippines—English language programming? Two possibilities here are the government's Voice of the Philippines on 9580 kHz at 1400-1700 GMT, and the Roman Catholic station, Radio Veritas, 1330-1400 GMT, on 9545 and 11725 kHz.

Taiwan—Here the major shortwave broadcaster is BCC, the Broadcasting Corporation of China at Taipei. English programs are aired at 0200 on 15345 and 17890 kHz, and at 1830 on 11825, 15345 and 17890 kHz.

Indonesia—There are several score of home service stations in Indonesia, a country that until recently put virtually all of its radio broadcasting "eggs" in the shortwave "basket." There are, even today, a relatively few medium wave broadcasting stations in this island nation. The English language overseas service is known as the Voice of Indonesia and can be heard from 1100 to 1200 GMT and 1400 to 1500 GMT on 9710 and 11789 kHz.

NEW PUBLICATIONS

A number of interesting publications of interest to DXers have been announced recently. Here are a few of them . . .

A regional Midwestern organization, the Great Lakes DX Association, has recently compiled a survey of stations to be heard on the 49 meter SW band. Actually, GLDXA has expanded the normal definition of the 49 m.b. to include in its list those stations of DX interest operating between 5200 and 7000 kHz. If you like to tune this segment of the SW dial, it is hard to beat the price—only 25 cents and a stamped, self-addressed envelope. The GLDXA address is 2609 Devonshire, Lansing, MI 48910.

If there is one, single, most-useful, can't-do-without book for shortwave listeners it is the annual World Radio TV Handbook, published in Denmark. It contains a wealth of information about the stations of the world, including schedules and the all-important addresses you need to write for QSLs. It has been termed, rightly, the DXer's "bible".

The 31st edition of WRTH will probably be available in late January or early February. At this time the price is expected to be \$10.95. WRTH is sold by some radio hobby clubs and some mail order dealers such as Gilfer Associates Inc., Box 239, Park Ridge NJ 07656.

Fans of medium wave DX, listening to the stations operating on the 540-1600 kHz AM radio band, who are looking for a top notch log of U.S. and Canadian stations, may find the newly issued National Radio Club "Domestic Log" of great use. I have no information as to how many of these fine lists are available so I suggest sending a stamped, self-addressed envelope to the NRC Publications Center, P.O. Box 401, Gales Ferry, CT 06335, for availability and price information.

IN THE MAILBOX

At the top of the stack is a letter from Greg Watts from Plainfield, IN. Greg uses a Radio Shack Realistic DX150B receiver, with which he has managed to log a nice list of stations. Among his more recent catches Greg lists La Voix de la Revolution Populaire du Beninoise, 4870 kHz, from Benin, formerly the West African country of Dahomey; Radio Garoua, 5010 kHz, in Cameroon; Radio-TV Ivoirienne, 4940 kHz, Ivory Coast and Radio Mogadishu, 9585 kHz, Somalia.

That's a nice batch of African loggings, Greg!

Greg goes on to say, "Here are some new addresses

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RF Power Scanner PDC 600



RF Power Scanner PDC 137



PDC 2812 Frequency Counter



FEATURES ON THESE QUALITY AMERICAN MADE PRODUCTS INCLUDE:

- * **Power Function**...output power is indicated directly on the power meter. The power switch positions 10, 100, and 1000, correspond to 0 - 10, 0 - 100 and 0 - 1000 watts on the meter.
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- * **SWR Function**...the Standing Wave Ratio is indicated on the SWR meter and allows continuous monitoring of the forward and reflected power ratio. This function is a must for CB'ers to determine how well their Antenna mismatch may occur because of weather conditions, poor contacts of antenna sections, oxidation, cable leakages, etc.

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of stations which DX Korner readers may find useful."

The Voice of Spain, Radio Nacional Espana/Radio TV Espanola, Prado del Rey, Madrid 24, Spain.

North American Service, Polskie Radio, 00-950 Warszawa Box 46, Poland.

Radio Budapest, 1800 Budapest, Hungary.

English Section, ORF, Austrian Radio, P.O. Box 1136, Vienna, Austria.

"Hey," writes Dave Casperson, San Francisco, "did you know that you can get a free DX bulletin every two weeks with up-to-date SWLing information in it? It is called Sweden Calling DXers bulletin."

Yes, indeed, Dave. I've been receiving the Radio Sweden bulletin here at DX Korner for years.

It is free, as Dave says. If there is a little catch to that, it is not an objectionable one. You are expected to send items, your DX news and logging information to use in Radio Sweden's program for SWLs, "Sweden Calling DXers." The bulletin, which is mailed out free to those who actively support the program, contains the items used in the DX program.

Send you best DX logging information to Sweden Calling DXers, Radio Sweden, International Service, S-105 10, Stockholm, Sweden, and ask to be included in the SCDX mailing list.

That wraps things up for this month. Let me hear from you before next month rolls around.

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ANTENNAS



The Monitor Post

by Rick Maslau, KNY2GL

MICOR SYSTEMS 90

Motorola's "MICOR Systems 90" Radio Accessory Group is a complete package of options that allows a businessman to customize his operation's two-way communications system.

The heart of the system is Motorola's "MICOR" FM Two-Way Radio. Completely solid state, this cool, reliable radio provides instant full-rated transmit power at turn-on. The mobile units are available in any of the four land-mobile frequency bands with power outputs ranging from 25 to 110 watts, allowing a contractor to select a MICOR mobile radio on the frequency and with the output power needed for his specific operating requirement.

The MICOR Systems 90 radio accessory group adds to this flexibility by providing the most comprehensive system of mobile accessory options available. Motorola MICOR mobile radio users can choose from more than 5,000 standard configurations.

One of the most popular accessories is the Selective Signaling Decoder (either QUIK-CALL or QUIK-CALL II), which allows selective calling of individual mobiles. If the message is of emergency or general nature, the system can be used to contact a group of mobiles.

The system can be programmed to alert the radio user to an incoming radio message when he is out of his vehicle, by either flashing the lights or sounding the horn briefly.

For privacy of conversations, the system offers Motorola's Mobile Speech Scrambler (VPA), which uses the frequency inversion method of audio scrambling to provide speech privacy over two-way radio communications systems.

The Systems CHANNEL SCAN Monitor for multi-frequency MICOR radios is an option often requested because the accessory allows the mobile operator to monitor one, two or three alternate channels without missing a call on the priority channel. An incoming priority signal automatically reverts the receiver to the priority channel and stops the scanning action.

One pushbutton-operated control panel on the accessory unit, called the Mobile Wild Card, can be used

in hundreds of different applications. The Wild Card can be used to control any of the electrical functions in the vehicle, or functions that can be wired externally.

Some suggested uses of the Wild Card are winch operation, control of electric motors, vehicle lights, portable lights, electrically operated hydraulic systems, ignition control of engines, remote operation of electric breakers or multiple contact relays, speed control, acoustic signal control, or burglar alarms.

For more information about how a Motorola "MICOR" system can solve your communications problems contact Barbara Bennett, Literature Distribution Center, Motorola Communications Group, 1301 E. Algonquin Rd., Schaumburg, Ill. 60196.



PLUG-IN INTRODUCED

Cushman Electronics has introduced a universal plug-in module for its CE-6 and CE-6A communications monitors. The Model 317 can be used for maintaining two-way single sideband radios as well as all AM and FM mobile units. The high sensitivity monitor duplicates the capabilities of several other plug-ins.

Sensitivity of the unit is from 2 to 10 microvolts, depending on frequency, allowing off-the-air measure-



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from the publisher of S9*

THE ELECTRONIC FLEAMARKET is a complete new shopping source for anyone interested in buying, selling or swapping used electronic equipment of any kind.

It will appeal to CBers, hams, experimenters and professionals.

THE ELECTRONIC FLEAMARKET will contain thousands of classified ads on transmitters, receivers, transceivers, test equipment, amplifiers, antennas, towers, stereo equipment, etc.

It will also contain ads from retailers, wholesalers, and manufacturers offering used equipment for sale.

Classified ads will be published free of charge to all regular subscribers of S9. Free ads will be limited exclusively to individuals. Commercial ads may be ordered at a rate of 25 cents per word, with a \$3 minimum. Non-commercial ads for non-subscribers are 10 cents per word, \$1 minimum. THE ELECTRONIC FLEAMARKET will be available on a paid subscription basis only at a cost of \$10 per year. All issues will be mailed by first class mail on the tenth of each month.

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ments of transmitter frequency and percent modulation without removing the radio from the vehicle or remote installation.

Frequency range of the Model 317 is 50 kHz to 1000 MHz, providing the monitor with extended capabilities in the lower ranges. Normally Cushman monitors measure down to 20 MHz, but with the new plug-in they can be used in the HF bands where much of the long range SSB communications is carried out.

Included in the plug-in is a SSB clarifier control for convenient monitoring of voice transmissions in order to check distortion and to verify station identification.

An audio output from the Model 317 can be connected to the oscilloscope in the monitor for observation of SSB characteristics and direct measurement of percent AM modulation.

Contact: Cushman Electronics, 830 Stewart Dr., Sunnyvale, CA 94086.



POWER FOR PORTABLE HAND-HELD RADIOS

A new portable/mobile repeater system, designated PAC-RT, expands the flexibility of current mobile radio users by permitting full portable communications capabilities while the operator is away from the vehicle. Easily added to any current trunk-mounted Motorola mobile and many non-Motorola mobiles, the new PAC-RT repeater unit provides mobile communications range while the operator is out of and within one mile of his vehicle.

A unique cross-band operation permits two different communications schemes; (1) a high-band VIIF portable can operate with either a low band or UHF mobile radio or (2) a UHF portable can operate with either a high or low band VHF mobile radio. Using a fully reciprocal balanced-system range design, the repeater will reach the portable whenever the portable is able to reach the repeater.

A proprietary digital logic circuit prevents interference normally caused by other repeaters being activated at the same time in the same area. And, the repeater can be switched out for normal portable-to-portable operation when desired.

For further information on the PAC-RT portable/mobile vehicular repeater system, contact Barbara Bennett, Marketing Services, Motorola Communications and Electronics, Inc., 1301 E. Algonquin Road, Schaumburg, Illinois 60196.

EXEMPTION FROM MANDATORY VHF CAPABILITIES

The FCC has proposed amending its rules to exempt single sideband (SSB) equipped vessels operating solely in Alaskan waters from mandatory VHF capabilities.

Part 83 of the rules now requires that all SSB equipped vessels have the capability to operate on the VHF frequencies by January 1, 1977. When it established this requirement, the Commission anticipated that by January 1977 there would be almost total coverage on all U.S. waterways and coastlines and that mandatory VHF capability would greatly enhance marine communications and safety.

However, the Commission said an FCC staff study had indicated that the VHF coverage by public coast and U.S. Coast Guard stations along the more than 33,000 miles of Alaska coastline was extremely sparse, and that only a small percent of the Alaska coastline was covered adequately by these classes of stations.

Since Alaska boat users are faced with the January 1, 1977, date for VHF, and the benefits to be derived are extremely limited due to the sparse VHF land station coverage, the Commission proposed to extend the mandatory VHF capability to January 1, 1982, for all Alaska registered vessels operating solely in Alaska waters.

It anticipated that this five-year period would provide an opportunity for the establishment of additional public coast and U.S. Coast Guard stations in Alaska.



25 WATT HI BAND RIG

General Aviation Electronics, Inc. (GENAVE) of Indianapolis, Indiana, has introduced a new 25 watt, high band transceiver. The unit comes in two models—the GMT-125 and the GMT-225.

The GMT-125 is called the "economy workhorse" of the GENAVE line. Modestly priced at \$345, the transceiver will operate between 143.9 and 173.4 MHz.

The GMT-125 is a one-channel transceiver and includes a 4-pole monolithic crystal filter. The inclusion of the crystal filter means that in most areas there is no adjacent channel interference. An 8-pole monolithic crystal filter is also available for those high density areas. A built-in heat sink enables the unit to operate

Free Classified Ads

Your classified ad may be run Free of Charge in *THE ELECTRONIC FLEAMARKET* — this offer is good for all S9 and/or Fleamarket subscribers every month. Please limit ads to thirty words or six lines and not more than two ads per month. You can buy, sell, swap or advertise for QSLs. Your ad may cover ham gear, CB gear, test equipment, stereo, or anything else an electronic hobbyist may find of interest.

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State _____ Zip _____

longer and more effectively. Included with the GMT-125 is a captive microphone.

The GMT-225 is the deluxe 25 watt model. The transceiver has all of the same fine features as the GMT-125, including a 4-pole monolythic crystal filter and built-in heat sink. The GMT-225 does include the addition of another channel, making it a two-channel transceiver, and substitutes a plug-in microphone for the captive mic. The GMT-225 is priced at \$360.

Included with both the GMT-125 and the GMT-225 are microphone, microphone clip, DC power cord and mounting bracket. Weighing only 6 lbs., and operating on 13.75 VDC, the units are easily installed anywhere.

The subaudible tone squelch is one of the most advantageous accessories for the GMT-125 and the GMT-225. The tone squelch allows your receiver to be activated only in response to calls placed within your own system. No distractions by everyone else's transmissions!

Other accessories available for both units include portable power pack (allowing portable operation), external speaker and 12 watt P.A. horn.

Also available are antennas for trunk lip mount, magnetic mount, and drill through mount.

Both the GMT-125 and the GMT-225 are type accepted under FCC Parts 21, 81, 87, 89, 91, 93, and 12; making them perfect for all type of business applications.

For more info, contact: General Aviation Electronics, 4141 Kingman Drive, Indianapolis, IN 46226.

USE OF BASE/MOBILE FREQUENCIES

The Commission has amended its rules to expand the secondary fixed use of base/mobile frequencies in the 450-470 MHz band for Public Safety, Industrial and Land Transportation Services.

It also extended until May 31, 1977, the date on which all point-to-point operations now authorized under Parts 89, 91, and 93 must be discontinued.

The present rules permit fixed operation on a secondary basis to regular base/mobile operations except within a radius of 100 miles (75 miles with reduced power) from the center of the 87 largest urbanized areas (200,000 or more population).

When these rules were adopted in 1968, the Commission said these urbanized areas had reached a level where frequency congestion existed and since the congestion probably would continue to increase, these areas should be protected.

After an analysis of the problem in several protected areas, the Commission found the more heavily populated areas were congested but in the more lightly populated urbanized areas, overall base/mobile congestion was not a problem.

The amendment eliminates the less populated urbanized areas from the restricted list and prohibits

Dealer Business Card Advertisement

This advertising section is reserved exclusively for CB dealers who wish to keep their name in front of their local customers, but who would otherwise not advertise in a national publication. The ads included are limited to one column inch; advertising copy is limited to non-mail-order type. The costs for business card ads are \$45.00 prepaid. In addition to the ad in the business card section, each dealer participating receives twenty five copies of the issue containing his ad, to sell or pass out in his store. For further information, dealers should contact the publisher, S9 Magazine, 14 Vanderventer Ave., Port Washington, NY 11050. Phone: 516/883-6200.

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QUALITY LINE ELECTRONICS INC.
STONY HILL PLAZA, RT. 6
BETHEL, CT 06801
203-792-7750
WHOLESALE RETAIL

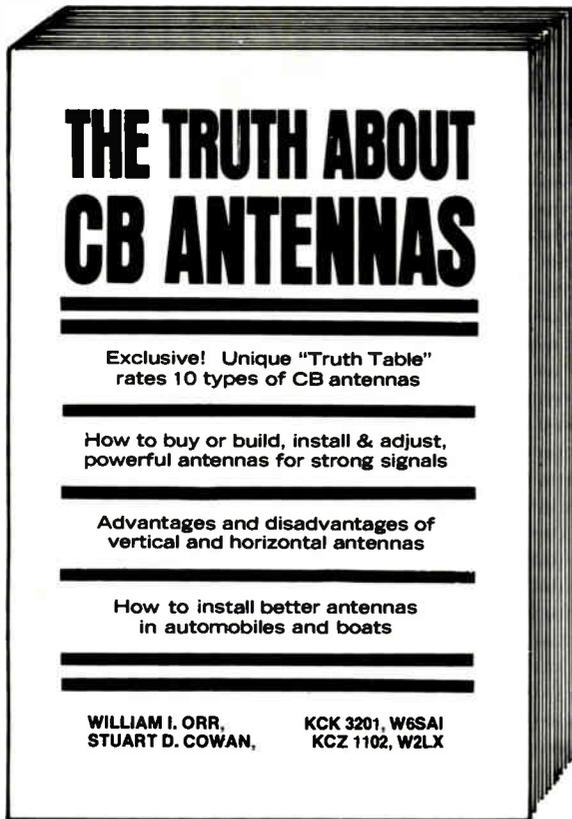
C.B. RADIOS POLICE & FIRE MONITORS
ESSEX ELECTRONICS CO.
705 SOUTH MARLYN AVENUE
BALTIMORE, MARYLAND 21221
WHOLESALE DISTRIBUTORS
DEALERS WELCOME
301-686-8080 RADIO & TV PARTS

 **SPEED EQUIPMENT INC.** (516) 883-7819
One of L.I.'s fastest growing C.B. Dealers carrying a full line of C.B. equipment in stock. We install what we sell! 
Sales: 139 Main St. Installations: 137 Haven Ave.
Port Washington, New York 11050

**TOP OF THE LINE RADIOS
AT BOTTOM OF THE LINE PRICES**
QUALITY LINE ELECTRONICS INC.
Transit Town Plaza
Williamsville, N.Y. 14226
716-631-3332
RETAIL WHOLESALE

"Dealer Business Card Advertisement"
Accessories * Antennas * CB Radios
RRR ELECTRONICS, INC.
2010 Elwood Avenue
South Bend, Indiana 46628
219-232-4688 Send for Wholesale price list

PRESCO
POST ROAD ELECTRICAL SUPPLY CO., INC.
310 Connecticut Ave. South Norwalk, CT 06854
WHOLESALE DISTRIBUTORS
CB Radios—Antennas—Accessories
Amateur Radios—Electrical Supplies
"When you have tried the rest"
"Now try the Best"
203-838-2319 203-838-9037



*New
Handbook
Reveals*

**THE
TRUTH
ABOUT
CB ANTENNAS**

\$5.95

*(postpaid)

- * Exclusive "Truth Table" gives actual Db gain from 10 types of CB antennas.
- * 240 pages — 146 illustrations — 18 chapters.
- * "A great CB Antenna Handbook!" - George R. Wood, KBI-3274 - W1SR, RCA.

Your CB antenna is the key to clear, reliable communications. Most CB antennas are improperly installed and adjusted. They do not work anywhere near peak efficiency. Moreover, to impress buyers a barrage of non-facts about inferior antennas is

used by some antenna manufacturers to gain quick sales. Now, for the first time, this new Antenna Handbook exposes false claims and gives you a unique "Truth Table" so you can determine for yourself the true power gain of any CB antennas!

Book Division, Cowan Publishing Corp.
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Port Washington, N.Y. 11050

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Sirs:

Please send me.....copies of **THE TRUTH ABOUT CB ANTENNAS**

Name _____ (Please Print Clearly)

Street Address _____

City _____ State _____ Zip _____

* Residents of N. Y. State include appropriate Sales Tax

point-to-point operations within 85 and 65 miles of the center of the top 40 urbanized areas.

The Commission said the new provisions should make available large, sparsely populated areas, where applicants could meet their relatively limited point-to-point requirements more economically than using microwave and yet be free from the restrictions imposed in the 72-76 MHz band.

It said also that the amendment allows licensees to accommodate important communications requirements but without substantial impact on the availability of these frequencies for present or future land mobile communications systems.

The Commission said it would be up to the various industry frequency advisors to coordinate, on an inter-service basis, the selection of frequencies to be used for point-to-point systems. It said responses to requests should be made as promptly as possible, and that if replies with specific objections were not received within a reasonable period of time (such as three weeks), they may be considered to be affirmative responses.

ADDITION TO DESIGNATED RADIO PROTECTION AREAS

The Commission has proposed adding the ports of San Francisco and Seattle to the designated radio protection areas for Vessel Traffic Services (VTS) purposes.

This proposal, which would amend Parts 81 and 83 of the rules, was in response to a request by the U.S. Coast Guard.

In two recent rulemaking proceedings, the Commission made VHF frequencies in the Maritime Mobile Service available for use in Coast Guard designated VTS areas in the ports of New York, New Orleans and Houston.

The Coast Guard now has requested that effective January 1, 1977, the frequency 156.6 MHz (Channel 12) be designated for exclusive use in the San Francisco radio protection area, and effective July 1, 1977, the frequency 156.7 MHz (Channel 14) be designated for exclusive use in the Seattle radio protection area, for VTS purposes.

Other than vessels in the port areas concerned which would use the specified channels only for VTS purposes, the rule changes, if adopted, would primarily affect Limited Coast Stations in the areas which may be operating on these channels. Licensees of such coast stations would probably find it advantageous to apply for a change of their assigned working frequencies.

EXPERIMENTALS OF INTEREST

KS2XIW, MCA, INC., Universal City, California. Mobile experimental research station to operate on 170.250 and 170.300 MHz for operation of wireless microphones by motion picture producers.

KU2XAA, KELSEY-IIAYES COMPANY, Ann Arbor,

Michigan. Mobile experimental developmental station to operate on 457.0, 42.96 and 151.625 MHz for testing of anti-skid braking devices on motor vehicles.

KU2XAB, CONRAC CORPORATION, Cedar Rapids, Iowa. Mobile experimental developmental station to operate between 26.96 and 27.41 MHz for testing and development of antennas and other accessories for use with CB transceivers.

KU2XAD, CONRAC CORPORATION, Cedar Rapids, Iowa. Fixed experimental developmental station to operate between 26.96-27.41 MHz for testing and development of antennas and other accessories for use with CB transceivers.

KU2XAE, CONRAC CORPORATION, Cedar Rapids, Iowa. Fixed experimental developmental station to operate between 26.96-27.41 MHz for testing and development of antennas and other accessories for use with CB transceivers.

KU2XAF, CONRAC CORPORATION, Cedar Rapids, Iowa. Mobile experimental developmental station to operate between 26.96-27.41 MHz for testing and development of antennas and other accessories for use with CB transceivers.

KU2XAG, NEW YORK STATE ELECTRIC & GAS CORPORATION, Binghamton, N.Y. Fixed experimental research station to operate on 169.525 MHz for operation of hydrologic monitors located on buoys in the cooling lake of an electric generating plant.

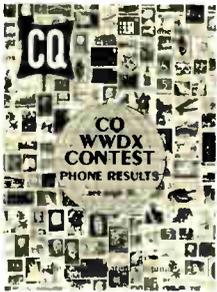
KU2XAH, NEW YORK STATE ELECTRIC & GAS CORPORATION, Binghamton, New York. Mobile experimental research station to operate on 170.225 MHz for operation of hydrologic monitors located on buoys in the cooling lake of an electric generating plant.

A NEW FIELD

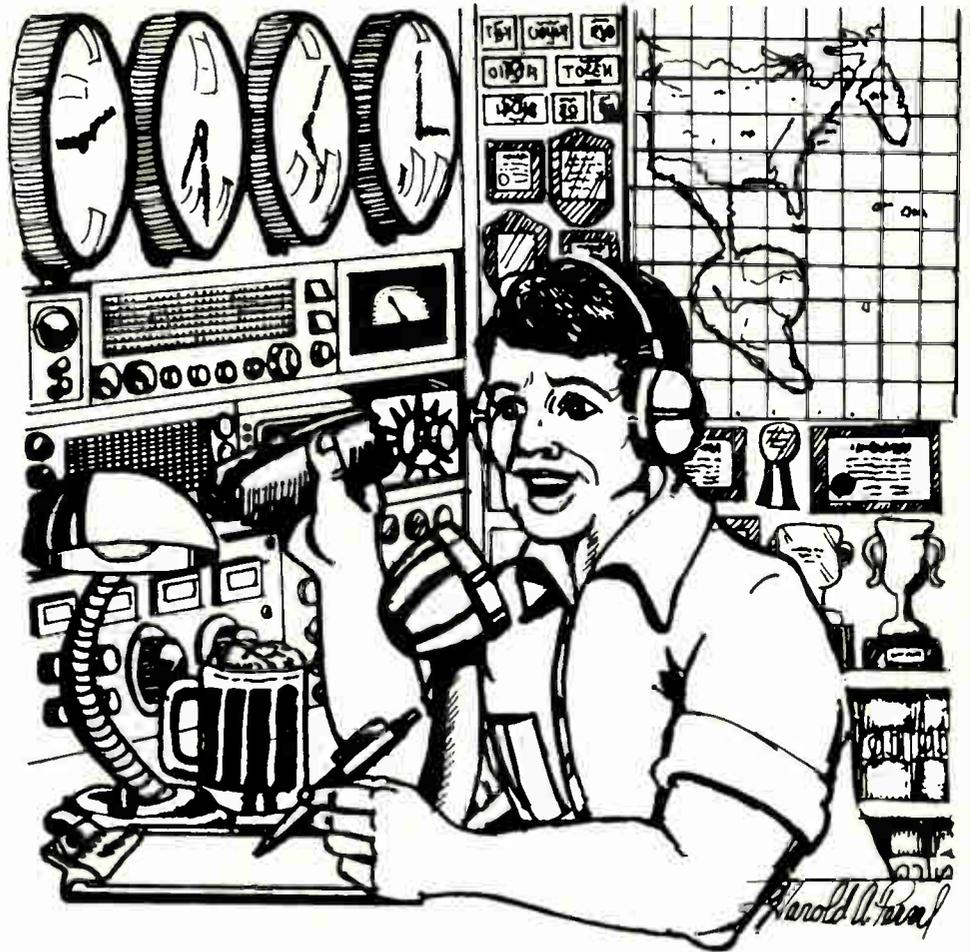
A while back your columnist was participating in a search and rescue operation—a really complex one which involved the state and local police, the sheriff, the CAP, several rescue squads, and many other organizations and individuals. While I spent many hours working at the search site, there were times when I dragged myself home simply too exhausted to do much more than lie on the sack and gaze at the ceiling—but even then I kept my scanner going, digging the sounds from the search operations! On my second day there I happened to meet a couple of people from the news media—a reporter from a newspaper and a newsman and his cameraman from a TV station—and, lo and behold, these cats were equipped with scanners! They also were equipped with 2-way communications systems of their own, mounted right in their mobile units—and, via these systems they were in rather constant communication with their news desks. There then followed some amount of *unsuccessful* prying on my part in an effort to learn their operating frequencies (the reporters didn't have any idea as to what they were, and the news desks were alternately ignorant of the information and protective of it). I made it a point on my next trip home to try to pin down this data for

INTERESTED IN HAM RADIO?

Then
S9's
 Sister
 Publication



is for **YOU**



A recent survey of S9 readers indicated that two out of every three replying to our questionnaire would like to become an amateur radio operator. And we're all for that, because CQ, The Radio Amateur's Journal, is the oldest magazine in our company's stable.

CQ is not just another ham publication; it's the only ham publication aimed at the beginner as well as the old timer. It's the only ham magazine that recognizes that every new ham isn't an electronic engineer. The editorial features in CQ are aimed at people — people like yourself who turn to amateur radio as a means of having fun.

CQ caters primarily to the operating end of radio, with just a smattering of technical material to keep you up to date on what's happening. And even the technical portions of CQ are presented in a manner that every new amateur will understand.

In other words, CQ is the fun magazine in the amateur radio field. It's the amateur magazine that you'll enjoy from cover to cover. And remember, CQ is brought to you by the same folks who bring you S9. What more could you ask for?



The
 Radio
 Amateur's
 Journal
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14 Vanderventer Ave.
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 N.Y. 11050

Dear OM:

Enclosed please find \$ for Year(s) Subscription to CQ,
 The Radio Amateur's Journal.

NEW: Start with issue
 RENEWAL

Name Call
 Address
 City State ZIP

	Domestic	Foreign
One year	<input type="checkbox"/> \$7.50	<input type="checkbox"/> \$8.50
Two years	<input type="checkbox"/> \$13.00	<input type="checkbox"/> \$15.00

future reference. After putting the wheels into motion on this, I fiddled around on a tunable set and was eventually able to locate the TV station's 2-way frequency (never could stumble on to the newspaper channel using this system). What I learned was that I found out *more* about what was going on at the search scene by monitoring the back and forth communications between the reporter and his news desk than I could by listening to the regular public safety channels—"hot leads" were reported on this channel sometimes 30 minutes to an hour ahead of anything on any of the several public safety channels I was monitoring.

Anyway, the search finally ended (successfully) and I was eventually able to obtain the exact operating frequencies of the TV station *and* the newspaper, plus channels authorized for several area radio stations, and I picked up crystals for these channels for my scanner. It's been a *total gas!*

I have monitored a great wealth of off-the-cuff theory, opinion, scuttlebut, and "inside information" from crime scenes, disasters, fires, accidents, search and rescue operations, traffic helicopters, even the entire communications of a TV film crew which was "on location" in my area shooting a scene for a private eye show. I have heard a number of direct "live" news remotes of important stories, and also learned that *after* the "live on-the-air" portion of the transmission, the reporter often followed up his thoughts with some tidbits which were saved for private audition—things which

no way would be heard on a public safety channel. I have heard, upon several occasions, the broadcast station's regular programming being broadcast over one of these stations and was told that it was because there was trouble with the landline link between the studio and the transmitter several miles distant and that this was a substitute way of getting the program there in a pinch. I have learned that in some metro areas, the operations of the EBS (Emergency Broadcast System) are coordinated between different local broadcasters are coordinated on these channels. I have also found that these stations are, generally, rather gracious about sending out QSL's upon receipt of a reception report—probably because QSL'ing is a way of life amongst broadcast stations anyway. In most cases, you'll get the QSL card that the broadcast station normally sends out with the callsign of the VHF station written or typed in under the broadcast callsign.

Well, I've been quietly taking all of this in and finding it more and more fascinating with each transmission, and I find it absolutely fascinating. I know that you'll also want to get in on this too! The one and only source of frequency data on these stations is a publication or directory of these stations, including 2-way communications channels of radio and TV stations and networks, news wire services, newspapers, etc. operating on more than 100 different channels starting at 30 MHz and running right on up through 470 MHz! Along with frequency data, there is information on the locations of the stations, their callsigns, and info on "who operates 'em." *Thousands* of stations.

It covers the 2-way communications channels of radio and TV stations and networks, news wire services, newspapers, etc. operating between 30 and 470 MHz! Along with frequency data, the information given includes station locations, callsigns, and info on "who operates 'em." So many stations are involved in all 50 states that the data has been separated into 2 publications—those systems east of the Mississippi River, and those west of the river (the State of Louisiana, which straddles the Big River, is included in the western edition). The eastern states directory is entitled *NEW MEDIA-I-EAST* (or simply NM-I-E for short), while the western states edition is *NEWS MEDIA-I-WEST* (NM-I-W)—and they are \$3 each (postpaid), or available as a complete set of both publications together for the combination rate of \$5 (postpaid), for the two parts. These publications are available from CRB Research Inc., P.O. Box 56-MP, Commack, N.Y. 11725.

I think you'll find that having this information available will add a new dimension to your monitoring activities, and you may be quite surprised to tune in on quite a bit of newsworthy data which never seems to pass through the mike of a police, fire, or other public safety station. But I've heard it myself, and a few of the news events I've been "in on" have turned up on these channels even before they went out over the police broadcasts!



Your Help Is Needed!

The Associated Humane Societies, in an effort to prevent the needless suffering of animals injured on the roads, is trying to reach Cbers. A statewide network would be formed to set up emergency service whereby injured dogs, cats and wildlife can be saved from an agonizing death on the roads when there is no one available to pick them up. If you care about animals, won't you please help? For further information on this volunteer animal ambulance corps, please write **Roseann Trezza, Asst. Director, the Associated Humane Societies, 124 Evergreen Ave., Newark, NJ 07114 or the Society's Monmouth County Branch located at 2960 Shafto Rd., New Shrewsbury, NJ 07724.**

CB SHOP



Rates for CB SHOP are 10 cents per word for advertising which in our opinion, is obviously of a noncommercial nature. A charge of 50 cents per word is made to all commercial advertisers or business organizations (minimum ad, \$20.00). Regular S9 display advertisers are exempt from the classified ad minimum rate. A 5% discount is in effect for an advance insertion order for six consecutive months.

We do not bill for advertising in CB SHOP. Full remittance must accompany full orders

sent in; otherwise, will not be run or acknowledged.

Closing date is the 5th of the third month preceding publication.

Because the advertisers and equipment contained in the CB SHOP have not been investigated, the publisher of S9 cannot vouch for the merchandise or services listed therein.

All paid classified ads must be sent to the attention of Eileen Lucey, Classified Ad. Manager.

ATTENTION CB DEALERS: Having hard time getting CB sets? We carry a full line, including Pearce-Simpson, Robyn, Browning, Johnson, Royce, Police Monitors, Crystals, New-Tronics, Antenna Specialists (E & S CB Sale & Service) R4, Winchester, IN. 47394 317/584-0343.

FEDERAL GOVERNMENT DIRECTORY. 1300 Channels. Lists nationwide frequencies for FBI, Secret Service, etc. \$5.00 Bearcat 101 programs for 700 channels not in owners manual, including Federal Government channels, \$5.00. Channel directories for Colorado, Nebraska and Wyoming, \$3.00. Blakeman Electronics, Box 288, Dupont, CO. 80024.

I'LL WRITE YOUR CB HANDLE into a poem. Send \$2.50 to Billy R. Smith, 616 6th Street, Hilltop Court, Bloomington, Illinois 61701.

CB RADIOS AT WHOLESALE PRICES! Listing 50 cents. Going Ham? YAESU FT-101 E in stock. Sideband Specialty, Box 573DC, Oak Harbor, WA. 98277.

JOIN INTERNATIONAL EMERGENCY RADIO PATROL. Details free. Write Box No. 434 Saint John, New Brunswick, Canada, E2 L4 L9.

SPECIAL- 100 QSL IRC'S- Only \$1.00. Tower SP, Drawer 10083, Charleston, S.C. 29411.

MOBILE IGNITION SHIELDING provides more range with no noise. Available most engines in assembled or kit forms, plus many other suppression accessories. Free literature, Estes Engineering, 930 Marine Drive, Port Angeles, WASH. 98362.

CB RADIOS, VHF/UHF monitors, crystals, antennas. All brands. Lowest pricing possible. Southland, P.O. Box 3591-F, Baytown, TX. 77520.

NEW CHANNELS! Copywritten book details how to install sliders, increase power, add new channels to most new and old units. Many pages. \$9.95 Tecom, Box 696, Welcome, N.C. 27374.

150 COMIC two color QSL cards printed with your name, address and call letters, only \$4.00 plus 85 cents postage. Check or money order. Pack includes 30 different comics. Albert Wilson, Route 9, Murfreesboro, Tenn. 37130.

WANTED: Car telephones and mobile telephone parts, heads, cables etc. Greg Hyman, 87 Yonkers Ave., Yonkers, N.Y. 10701, 914-476-4330.

CALL SIGN AND HANDLE engraved on 1x3 plastic badge with pin/clutch. Choice of colors, all with white lettering- maplewood, green, red, black, blue, orange- \$1.75. H & H Plastic Engravers, P.O. Box 6606, Pine Bluff, ARK. 71601.

DEALERS WANTED. Most major CB brands, scanners, Ham gear. Large inventory, low prices, fast courteous service. JRD Distributors, 131 Harbor Circle, New Orleans, LA., 70126. 504-241-8500.

HORNET ANTENNAS SELL BEST. Immediate delivery. Dealer inquiries invited. Hornet Antenna Products, Box 880, Duncan, OK., 73533.

BECOME A RADIO AMATEUR Read "From CB to Ham Beginner". All you need to know in one easy-to-understand book. Only \$4.95 at all stores handling "Sams" publications. Or order autographed copy latest edition direct from author (add 50 cents for handling). J.A. Stanley, 855A South Fillmore St, Denver, CO. 80209. Money-back guarantee.

DEALERS- Check our extremely low prices and same day shipping for Midland, Shakespear, Turner, Breaker, Amphonel, Consolidated Towers and more. Send for free catalog. Sugar Shak Distributors, 1025 N. King St, Hampton, VA. 23669. 804-723-7024.

FCC TEST ANSWERS \$10.00 specify class Dixie Tec Box 8352, Savannah, Georgia 31402.

I'M STUCK WITH 9 Auto alarm systems, will sell for \$10.98 each plus 50 cents postage. Send cash or money order to Dr. Al Sandefur, 208 So. 5th St., Leavenworth, TX. 66048.

QSLs!...Sample Kit - 25 cents. Immediate attention and courteous service. G. E. French, P.O. Box 101, Poestenkill, NY., 12140.

MAKE MONEY JUST LISTENING! To CB or Police Monitor radio. New report shows many ways. No broadcasting. Works anywhere, anytime, for anyone! Little risk, small investment, earns excellent income for years! Report only \$5.98. Economy, Box 23-S9, Highland, MD., 20777.

CB DECALS: 12 new designs, all in color, individually polybagged, self-adhesive, weatherproof vinyl. Retail at \$1.00 each. Wholesale prices available to dealers, clubs and associations that offer 100% and more profits. Prices include free display racks, free advertising placards, and free shipping in USA. Fantastic for coffee breaks and jamborees. Send for Free full-color catalog sheet to: Walking Tall, P.O. Box 659, Bronx, NY., 10469 or call 212-863-4848.

CB DEALERS- Send today for our price list, same day service. Reputable company in CB business for over 8 years. Over half-million dollar inventory. CB Distributors, Box 15883, Baton Rouge, LA., 70815.

FUZZBUSTER RADAR DETECTORS, tremendous discount, Master Charge. Immediate shipment guaranteed. H & B Enterprises, Box 477, Candler, N.C., 28715.

NEED A BIGGER SIGNAL for those long haul contacts? Manual includes easy to build, low cost, high gain antenna projects plus kicker circuits using old TV parts. Send only \$2.25. Megawatt Power, Box 278, Lawton, MICH., 49065.

QSL CARDS- Top quality, reasonable prices, 12 colors, gloss-coated, custom made for you. Free catalog. Write to CBC Club, Dept S9, Box 703, Lexington, N.C. 27292.

QSL CARDS- 2 color 12 pt. glossy white, 500 for \$10.00, 1,000 for \$18.00. Over 300 designs. Catalog & Samples, \$1.00. Life Guill-Rustburg, VA. 24588.

DEALERS ONLY: Tremendous savings on name brand CB radios and accessories. No minimum order. Monthly specials, bonuses. Fast service. Send business card or letterhead for Free Catalog. Marko Electronics, 2028 W. Central, Toledo, Ohio, 43606. Phone 419-472-0351.

BE AN EMERGENCY CHANNEL 9 MONITOR. Send self-addressed, stamped envelope for information and membership application for US Ears (United States Emergency Assistance Radio System), a new nationwide monitoring team. US Ears, Headquarters, P.O. Box 1956-A, San Jose, CA. 95109.

BUY SMART! The Underground Buying Guide: Over 600 sources, 200 categories, large and small mail order firms, discount CB and experimenters' equipment, accessories, parts, and more. \$5.95 plus 55 cents postage. Californians 39 cents tax. Moneyback guarantee. PMS, Dept M, 12625 Lido Way, Saratoga, CA. 95070.

\$1.00 ENGRAVED HANDLE-CALL BADES for coffee breaks. No minimum. Fast service. 1" x 3" plastic. White letters on red, blue, black, green. Black on white, yellow. Max line (1 or 2): 16 letters, spaces. Guaranteed. Holly Engraving, Box 3926-E, Hollywood, FLA. 33023.

HANDLES, HANDLES, HANDLES. Looking for an Uncommon original handle? How about: Loud footprint, Plaid pineapple, Space base, Noisy oyster, Neon nerd, Skinny guinea, Happy cooker, Ketchup float. The CB Handlebook has thousands more, all unique, novel, imaginative, colorful, weird, clever, humorous, personal, cool, feminine, racey, descriptive, and functional handles. \$2.65 Handlebook, 977 SE 9th Ave., Pompano Beach, FLA. 33060.

DEALERS WANTED: Profitable spare time business. Best wholesale prices. CB radio-antennas-monitors-accessories. Central USA for best shipping. Send card or letterhead for price sheet. Sunridge Electronics, Inc., Rt. 2, Box 375 S, Hillsboro, MO. 63050.

DISCOUNT PRICES for the retail public on all citizen band radios and accessories. Buy from a reliable mail order company and save money. Hundreds of items. Send 25 cents to cover cost of mailing catalog. Patches Trading Co., 22 Bethesda Lane, Sayville, N.Y. 11782.

MOVE UP TO HAM RADIO: Yaesu FT-101E \$749.00, FT-101EE \$659.00, FT-101EX \$599.00, Fan and Filter installed \$76.00, Kenwood TS-520 \$629.00. Free Ups 48 states-factory authorized sales and service-1st class FCC Technician, all lines of Ham gear available. Dealer inquiries invited. Comm-Tech Enterprises, 13754 Victory, Van Nuys, CA. 91409.

FCC TEST ANSWERS \$10.00 any class specify Dixie Tec, Box 8352, Savannah, GA. 31402.

HIGH FREQUENCY CRYSTALS - Huge inventory, all radios AM & SSB. Write giving radio make, model and frequencies desired. Same day shipping, \$5.95 each. Dealer inquiries invited. Xtals, Box 42, Prospect Heights, ILL. 60070.

CB HAM DEALERS: Send your letterhead for free catalog. Siltronix, Swan, Midland, Pearce-Simpson D & A, Black Cat, Hustler, Avanti, etc. Appliance & Equipment Co., Inc., 2331 Vance Jackson, San Antonio, TX. 78213. 1-512-733-0334.

JOIN THE BROTHERHOOD OF CB'ERS a Nationwide organization. Equipment and handle registry; overnight accommodations; bi-monthly magazine published by us; ID Card; bumpersticker and more. Complete membership \$5.00 or free details. Box 461, New Haven, Connecticut 06502.

WYOMING RANCH LAND. 10 acres \$30.00 down, \$30.00 month. Owner-Mike Gauthier, 955 OG Gallatin, Downey, CA. 90240.

WE NEED DEALERS! Get on our mailing list for weekly dealer specials on Citizens' Band radios and accessories. Over 100 major lines. Our dealers enjoy same-day service, dealer-support aids, plus access to dealer discounts on several hifi and other consumer electronic merchandise. You will Profit as a 10-4 dealer. Write today: 10-4 Communications, 704 W. Buffalo St, Ithaca, N.Y. 14850.

BE AN EMERGENCY CHANNEL 9 MONITOR! If you live in California, we invite you to join Cal-State Emergency Radio. For information and membership application, send self-addressed, stamped envelope to CSER, P.O. Box 1956 A, San Jose, CA. 95109.

ZANY CB BUMPER STICKERS! No. 5005 CBers DO IT WITH FREQUENCY. No. 5006 Honk If You Love CB. No. 5007 We Brake For Beavers. \$1.00 ea. 3/\$2.50 Add 25 cents/order postage & handling. Write for club discounts. U.S. Publications Service, P.O. Box 34911, Dept. S, Washington, D.C. 20034.

CB DEALERS- Send letterhead for complete wholesale catalogue on all communications equipment. Four Wheeler Communications, 10 New Scotland Ave., Albany, NY. 12208. 518/462-0202.

CB'ERS- Shoot legal "skip" world-wide on thousands of channels! Join ARC to learn how. \$4.00 Life Membership or 25 cents brings information. American Radio Council, Box No. 1171, Garland, Texas 75040.

QSL CARDS- Something completely different! Nothing even close to it on the market! Not made of paper or card stock! The "Cadillac" of QSL's! Samples: \$1.00-Fully refundable with order. Mac's Shack; Box 1171B; Garland, Texas 75040.

SMOKEY'S RADAR BUGGING YOU? Loaded with speeding tickets? Insurance gone up? We have the answer. H & B Enterprises, Box 477, Candler, N.C. 28715.

CB'ERS! MANY MORE CHANNELS. More power, uncrowded, more fun. Quality! Copyrighted report tells why, where and what to do. \$2.00 Moneyback Guarantee. Alpha Research Consultants, Suite 125-S, 1715 Chevy Chase Drive, Austin, Texas 78752.

YELPING SIREN ALARM- for your car. Activated by existing door buttons for courtesy lights, stays on once door opens until deactivated. Use existing P.A. speaker or install separate speaker. 12 Volt with 5 watts output. Highest quality PC board and components. Unit assembled, tested, less speaker on-off switch \$14.00 Simple installation instructions included. Siren Alarm also available whereby interruption of grounded trigger line activates unit, \$12.00 Stop Burglar Alarms, Box 500, Hiawatha, Iowa 52233.

A CUSTOM DESIGNED CARRYING CASE for 2 Way Radio, the Carryer. Carry your radio extra mike, tools, meters in separate foam compartments. A quick mount antenna cigarette lighter plug and any rig can be safely portable. Send \$24.95 plus \$1.50 for cost of handling to Alli Industries, P.O. Box 68, Centereach, N.Y. 11720. Phone 516-588-6695. Allow 4 weeks for delivery.

BEST PRICES- On Johnson SBE, Tram, Browning, Midland, Antenna Specialist, Avanti, Antenna Inc., Shakespeare, Turner, Astatic Mura, CDE, Para-Dynamics, Vanco, & Gold-Line. Write for free price list. CRS Communications, 1552 Central Park Ave, Yonkers, N.Y. 10710.

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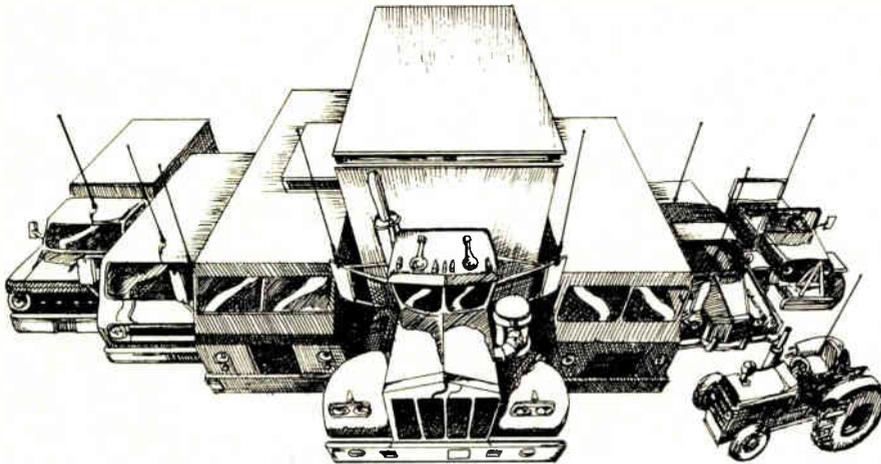
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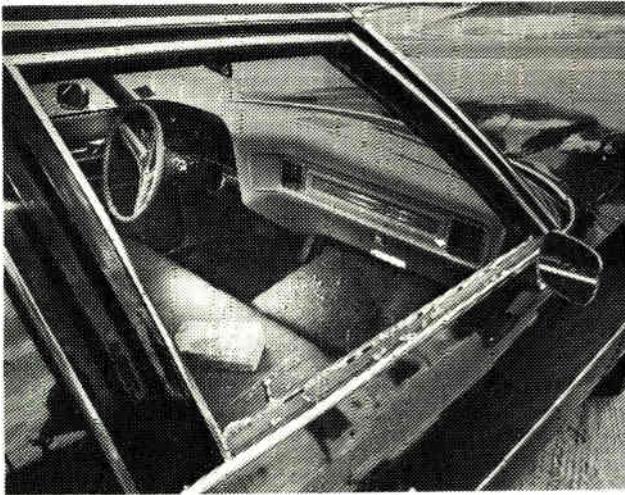
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- Many times this number are burglarized, resulting in BILLIONS of dollars worth of property losses to people like you and me.
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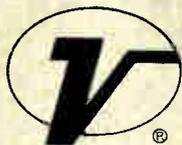
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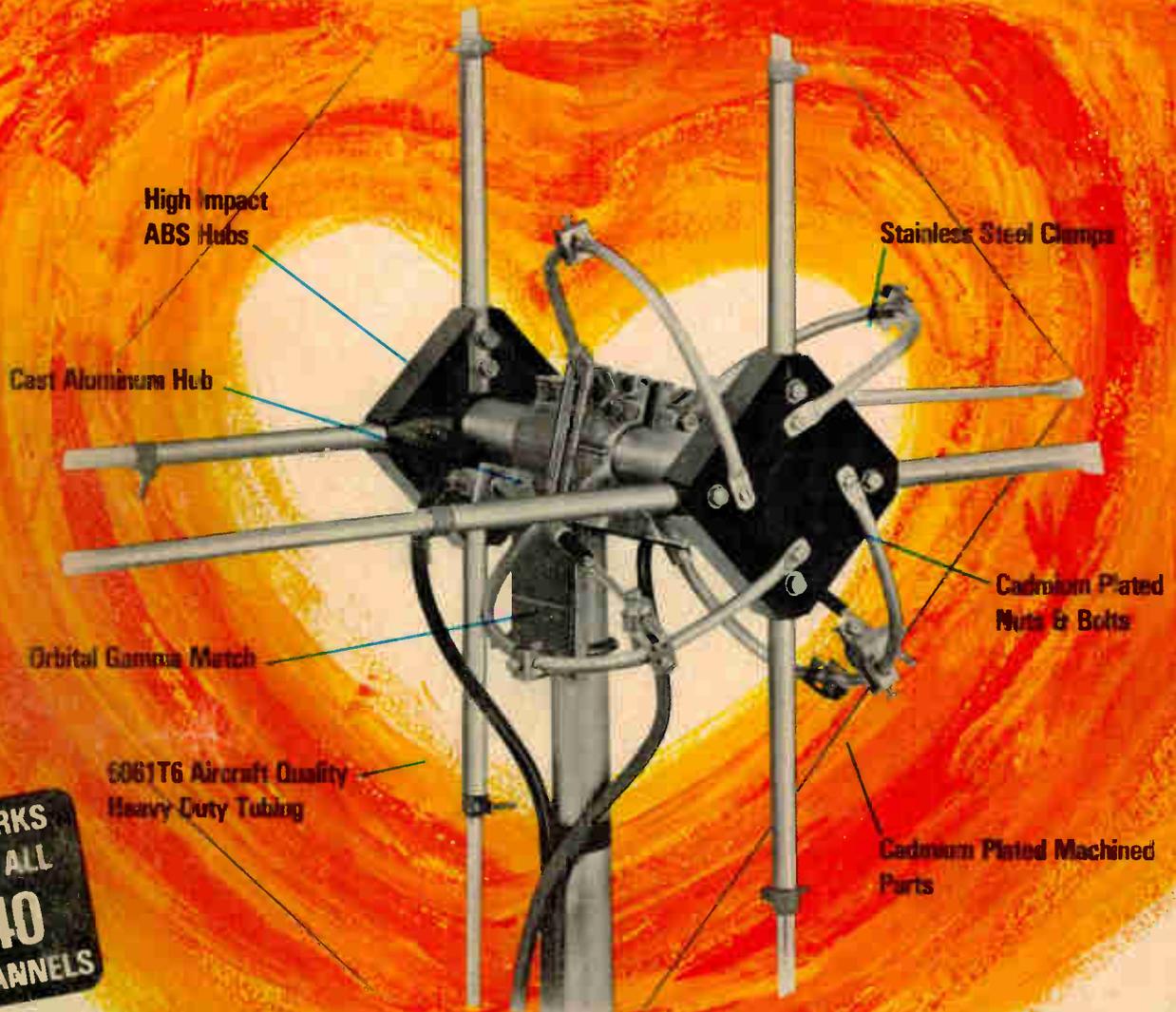
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