

CB

RADIO

AMERICA'S OLDEST AND LARGEST CB MAGAZINE

Dec. 1977

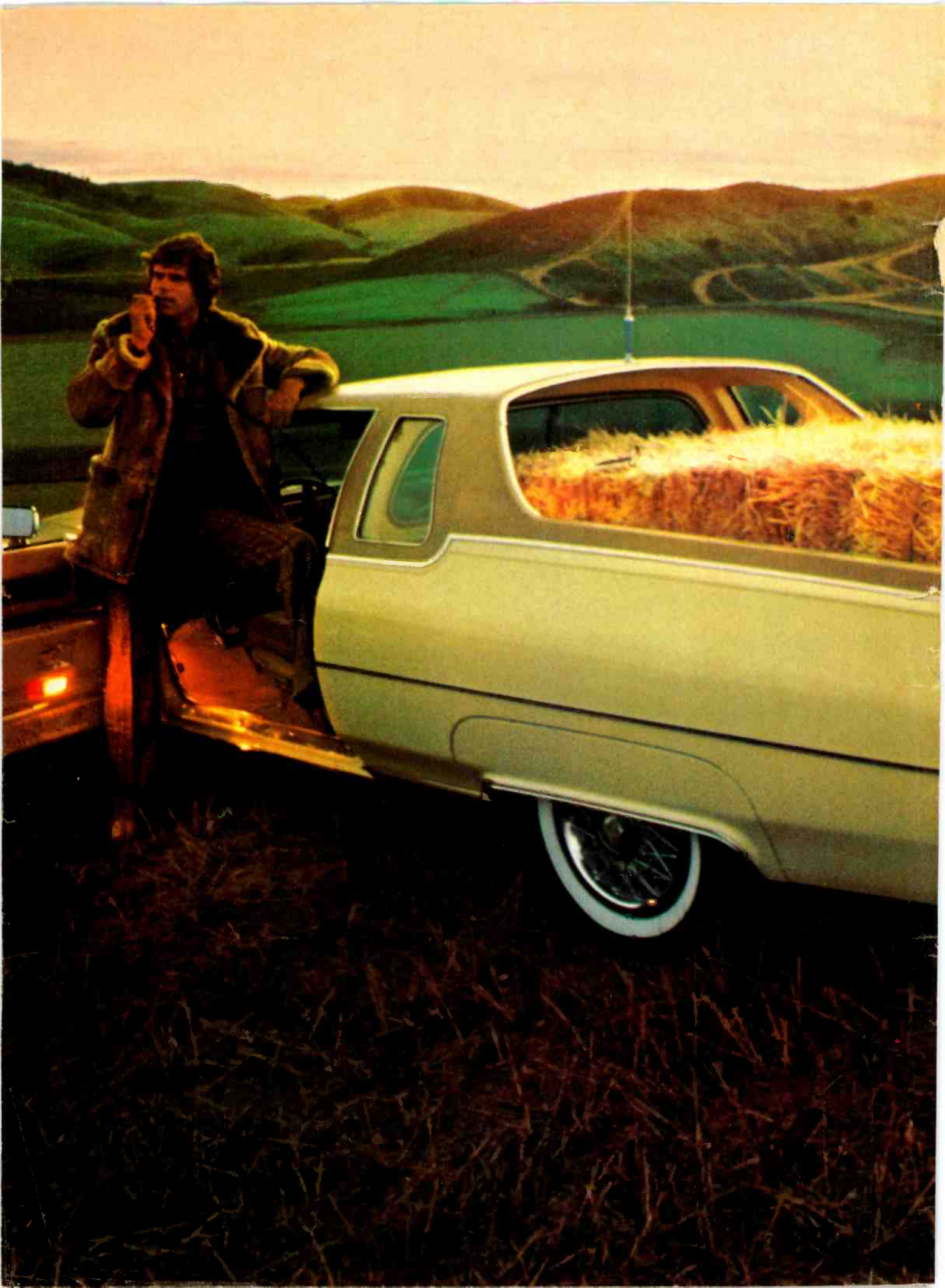
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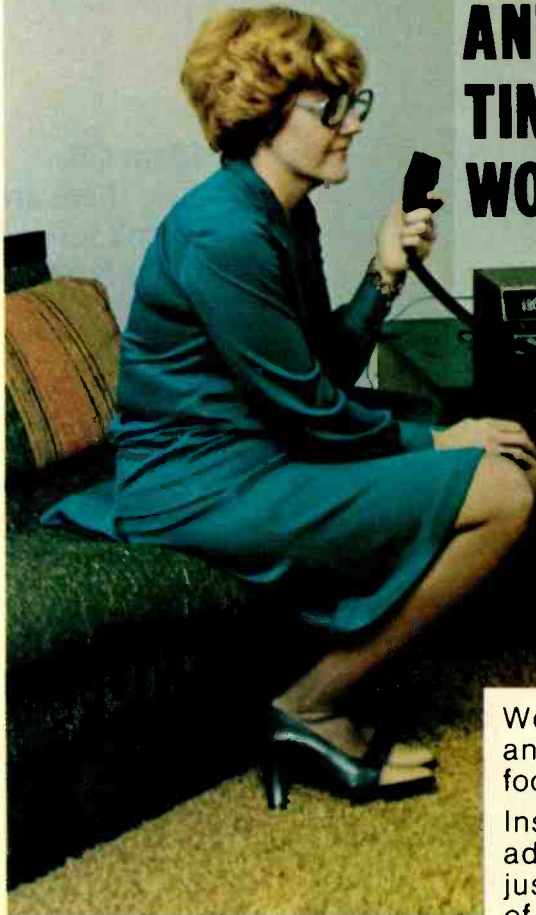
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CB RADIO S9

AMERICA'S OLDEST AND LARGEST CB MAGAZINE

VOLUME 17 NUMBER 12

DECEMBER 1977

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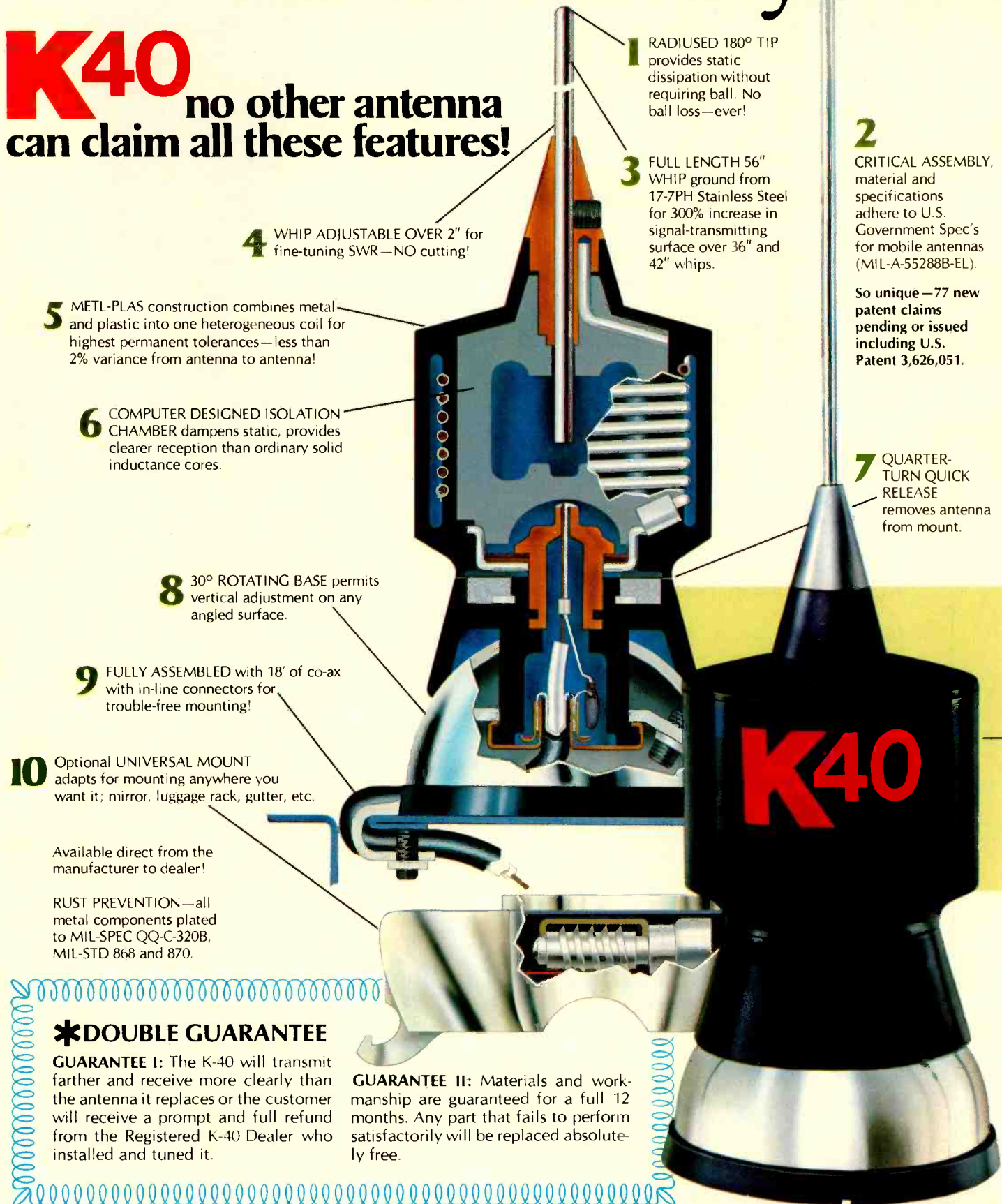
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GUARANTEE I: The K-40 will transmit farther and receive more clearly than the antenna it replaces or the customer will receive a prompt and full refund from the Registered K-40 Dealer who installed and tuned it.

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to transmit farther and mobile CB Antenna made!*

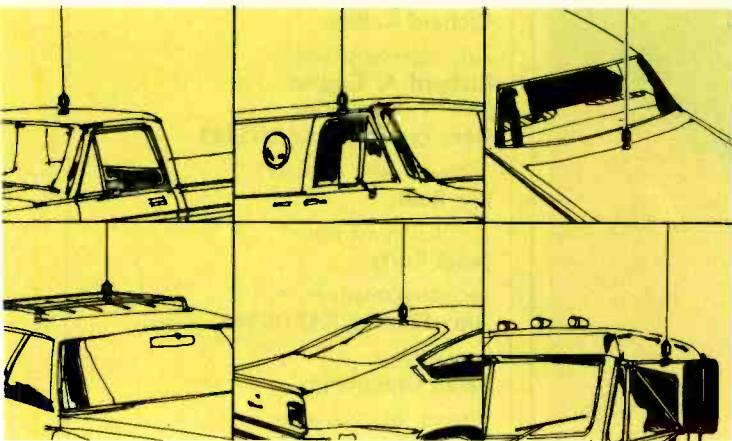
\$38.50 buys all this performance...
and wait'll you see it transmit!

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30% increase! *Average performance rated (VSWR and Efficiency combined) 30.5% better than all other brands tested, including Antenna Specialists, Avanti, Hy-Gain, Shakespeare, Turner, Newtronics, etc.

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for a demonstration.**

Here is what those CB'ers actually said:

K-40 vs. ANTENNA SPECIALISTS

"I'm a truck driver and I've been a CB'er for ten years. Compared to my Model M-410, "Big Momma," I recorded a 40% to 50% increase in transmission distance, clearer reception and a lower SWR by 20%. Frankly, the K-40 is the best antenna I've tried so far—over Antenna Specialists, Francis, Shakespeare, Hustler, Avanti—I tried them all!"

John H. Collett, 207 McFee, Bastrop, Louisiana

K-40 vs. NEWTRONICS

"Compared to my XBLT-4, the K-40 can consistently transmit 40% further and the reception was better. I compared the two antennas using my Cobra Model #138 which has 69 channels. Quality is very good. I'd say the K-40 is the perfect way to complete any CB system."

Jerome R. Browne, 7800 S. Linder, Burbank, Illinois

K-40 vs. HY-GAIN

"I own a Volkswagen dealership and I've been a CB'er for over 12 years. I operate a TRAM XL5 with a Hy-Gain HELL CAT antenna that I've owned for over a year. The K-40 was better in reception with a measured SWR of 1.2. The K-40 was 20% better than the HELL CAT and transmitted 50% further."

Dale A. Dayden, 14 Barbara Dale Lane, Annapolis, Maryland

K-40 vs. FIBERGLASS

"I replaced my Francis with the K-40 and greatly improved my reception. The transmission was excellent, about a 30% improvement over my Francis. I talked well over 45 miles to an Astro Beam base. K-40's SWR of 1.1 was 10 to 20% better than my Francis!"

H. Ganse, 1964 Mt. Zion Road, York, Pennsylvania

K-40 vs. DUAL-ANTENNAS

"My twin Hustlers do not perform as well as the K-40. I got an improved performance on reception and about a 30% increase in transmit distance using the K-40. I've been a CB'er for 17 years, and I'd say it's superior to any other antennas."

James L. Andrews, P.O. Box 1509, Titusville, Florida

K-40 vs. WHIPS

"I'd rate the K-40 superior, although the transmission and reception of the K-40, compared to my 102" Antenna Specialist whip, was just about identical. I was able to tune the K-40 lower than my 102" whip. I think the K-40 is one of the best looking antennas on the market and overall, I'd rate the performance about as good as my 102" whip."

Daniel A. Rohlf, R.R. #2, Box 88, Binford, North Dakota

K40

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CB RADIO \$9

AMERICA'S OLDEST AND LARGEST CB MAGAZINE

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CB NEWSWIRE

YOUR CB NEWSPAPER

DECEMBER 1977

CB Radio Increases Freedom For Conn. Youth

For 16-year-old Paul Munzu Jr., (CB) radio has meant increased freedom from the restrictions imposed by cerebral palsy and a wheelchair.

Two of his fondest dreams—riding in an 18-wheeler tractor-trailer truck and visiting a police station—have come true thanks to his CB pals.

His parents are thrilled because they believe CB radio has “opened up a whole new world for Paul.” They say it has allowed him to do things he has never done before and broadened his horizons considerably.

Paul, whose CB “handle” is “WC” for wheelchair, got his CB radio last

December. Over the airwaves he met Mrs. Annette Norup of North Haven, known to CBers as “Mrs. B.”

Paul told her he’d like to be able to someday get an electric wheelchair and a hospital bed, and Mrs. Norup decided to help. The new wheelchair and hospital bed would enable him to get around better and would help his parents in caring for him, Paul explained.

She organized a coffee break on Interstate 91 to raise money for Paul.

Truckers and other CB fans who heard about the special coffee break went to the highway exit for the three-day long coffee selling fund-raiser and contributed more than \$3,500.

CBs Helped Aliens To Escape

Illegal aliens used citizen band radios to escape immigration officers in Wash. State.

A Border Patrol officer at the scene of a raid said the operation failed because aliens have been monitoring police radios and then warning the far-flung camps by CB radio when officers approach.

He said evidence was found of as many as 16 camps near the farm, including tent stakes and abandoned campfires, but the residents had fled by the time officers arrived.

Army Flounders In Red Tape But CBers Locate Two Girls

Citizen Band radio operators in West Germany have found two missing American teen-aged girls while U.S. military organizations contacted by the desperate parents floundered in red tape.

T.Sgt. David E. Seler, of Harrisburg, Pa., said his 13-year-old daughter, Tammy, and her girl friend, Dianne, also 13, disappeared from their homes near Kaiserslautern on a recent morning.

I contacted everyone I could think of to help us find them,” Seler recalled in an interview.

“Finally, somebody suggested the CB radio people, so I contacted a guy in Landstuhl who has a base and he immediately put out a description of the girls and it was not seven hours later that a CB’er in Wiesbaden called in to say that someone had spotted her in his area.”

CB’ers kept on the case until the girls were found.

Seler said the girls “decided to take a vacation,” carrying a knapsack and \$50 on their journey. The CB network of searchers finally tracked them to the Wiesbaden home of a woman for whom Tammy once had worked as a baby sitter.

Kaiserslautern is about 50 miles from Wiesbaden.

“Once we got her home, my daughter, my wife and I discussed her vacation at length and how many people she had worried.”

“What the CB people did is magnificent,” Seler said. “As soon as I contacted somebody with a radio, he wasted no time putting it out. In fact, the man stayed up all night monitoring the radio.”

But Seler said he could get no action from the Air Force security police or the Red Cross.

“I was trying to get the message out, too, on Armed Forces Network Radio and a picture on television, but the

security police here said they did not handle that,” Seler recalled.

‘So we contacted the Red Cross, and the Red Cross lady did everything she could do to help me. She called and said the security police would take care of it and that they would call me. But I waited and waited and finally called her back and she contacted the security police once again.

“When she called me back this time, she was cussing a blue streak. She finally went to the Landstuhl commander and complained about it.”

Seler said the Red Cross told him it could do nothing unless it was a matter of life and death and the security police said he had to go through the Office of Information.

“Would you believe it? When I finally found her, they still had not done one thing,” Seler said. “The typical answer I got from the security police when I phoned was, ‘I went off duty at that time.’”

CB Radio Hits Mo. General Assembly

Citizens Band Radio has hit the Missouri General Assembly in Jefferson City, where the good legislature buddies are thicker than smokies at a trucker's convention, according to a story by United Press International.

"This is one of those stories that probably will win the award of the year for significance," said state Treasurer James I. Spainhower, also known as "Wooden Nickel."

Spainhower was one of dozens of legislators, state officials and capitol hangers-on whose CB "handles" were published in a booklet recently by Rep. Joseph Kenton.

Kenton, an avid CBER, said he compiled the listings because he wanted to talk with some of his good legislative buddies on the roads to and from the capitol every Monday and Thursday.

A spot check revealed few admit to using the CBs to spot smokies and violate those 55 mph speed limit they voted into law two years ago.

"If I'm in a hurry, I just follow a trucker," said Rep. Russell Brockfeld, whose handle is "Flying Red Horse" because he owns a Mobil service Station in Wright City.

Rep. Irene Treppler, appropriately is addressed as the "Speed Queen." Two years ago, she and former Rep. Mildred Huffman, were stopped for speeding on their way to the legislature by one of only two female highway patrol troopers in the state.

Rep. Richard DeCoster, says his CB has become a useful tool for talking to constituents. When he's around the capitol, DeCoster is the "Budget Cuts," a handle concocted by his fiscal conservative colleagues.

Party Crashers Use CB

Looking for some action? Flip on your CB, chances are there's a party just around the corner.

That's what many teenagers are doing these days, and police in some places fear the problem will get worse with the warm weather and more parties—and more party crashers.

In California's San Fernando Valley, for instance, police say it's not uncommon for a party host who invited 50 to his bash to find 400-500 revelers at the front door, thanks to the Citizens Band.

Last year, officers say, one hapless host was overwhelmed by 1,600 uninvited guests, many of whom had heard about the party over the CB airwaves.

"We've had calls for help from people who couldn't get out of their houses because of the large number of party crashers," said Capt. Glen Levant of the Los Angeles Police Department's Devonshire Division in the upper middle-class north Valley.

"These party crashers, most of whom are in the age group of junior high to about 25, bring their own booze or marijuana, and often devastate the neighborhood," Levant said.

Although the old-fashion verbal grapevine remains the primary way of spreading news of a weekend party, Levant says the CB airwaves increase the number of persons who get the word.

Levant stressed most of the party crashers are not members of organized Citizens Band radio clubs, but more typically are affluent teenagers who like to use the CB radios in their cars merely to gossip with their friends.

These teen-age talkers, prevented by their parents from lengthy conversations on the family phone, carry on longwinded discussions from the front seat of their automobiles, police say, clogging the airwaves with chitchat.

It doesn't take long for the word of a party to spread this way and, like bees to honey, the youths flock to the scene of the bash, ready to enjoy themselves in spite of a concerned host who didn't invite them.

Often when the rowdy guests are asked to leave, the host is answered with a shower of beer cans and bottles of various beverages.

While admitting there are limits to what a party host may do to prevent such occurrences, Levant suggests several ways to lessen the chance of having a party crashed.

He recommends having a guest list, sending out invitations, and admitting only those persons who are invited.

If uninvited guests arrive, Levant suggests the host refuse to admit them in the hopes they will put the word out over the airwaves that the party is closed to all but those with invitations.

The Texas Wheelchair Cowboy

CB radio antennas may be as common as blue jeans but Albert Kilian says people still look twice when they see one hooked to his wheelchair.

Kilian, the "Wheelchair Cowboy," is a personnel management senior at St. Mary's University.

He said he has wanted a citizen's band radio since he was in high school.

"My parents gave me a pair of walkie-talkies instead," he said.

About one year ago Kilian bought a secondhand radio and acquired, piece by piece, the extra equipment necessary to attach it to his wheelchair.

"The battery was the biggest problem," he said.

At first he considered an auto battery.

"But, any car battery weighs about 20 pounds. I can't see pushing that extra weight up those steep ramps at St. Mary's or anyplace else," he said.

He finally decided on a motorcycle battery, which he mounted near a rear wheel of his chair.

He had a leather case made and attached beneath the seat to hold his radio.

Kilian said the radio gives him security when he goes out. He has used it three times to call for assistance when he became stranded without transportation.

"Sometimes people passing me on the street will see my antenna and call just to be sure if it's the real thing," he said.

Although he has met only three of the people he talks to regularly, he said he has made several "CB friends."

"I feel like I've taken a step up the ladder in status, because I've accomplished a goal I've had since I was a teen-ager," he said.

Kilian wanted to get an amateur radio operator's license, but the Morse code requirement was too difficult, he said.

Kilian has cerebral palsy and his coordination and speech are impaired.

He has been in speech therapy most of his life.

"My goal is to let people know who the Wheelchair Cowboy is, let them know I'm in a wheelchair and that I'm handicapped, so if I call for help, they'll come."



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the shortest distance between two CB's

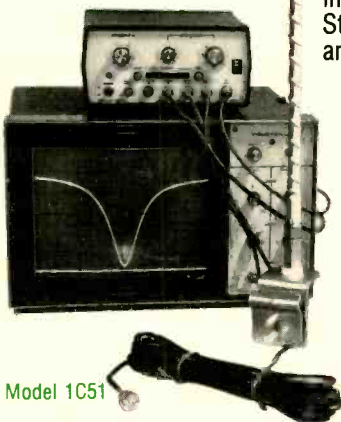
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You won't believe your ears when you first try the incredible Antler Miracle Stik. Your CB has never performed like this before. Distances shrink as crisp, clear signals reach out miles further. SWR's are low and flat to assure a wall-to-wall signal at every channel of the 40 or 23 CB band.

The secret is in Antler's unique centerload winding plus individual electronic tuning and testing by Antler's quality control inspectors in our own U.S. factory. Move up to Antler's incredible Miracle Stik . . . the antenna that delivers more signal strength from any CB.

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48" fiberglass stick, centerload with adjustable fine tuning for individual installations. Long filament fiberglass in seamless, weatherproof vinyl sheath. Pictured with accessory 3/8"-24 insulated adapter, adjustable mirror mount and coax cable assembly. Also fits Antler trunk lid, trunk groove; gutter, 2" swivel ball bumper and body mounts.



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His Ears On The World

To the folks with citizens band radios in Northern Virginia, "Jarhead" is just another "good buddy."

But Lynn Bonner is not your ordinary CBER chatting from his car or truck while rolling along the highway. He is a 23-year-old paraplegic whose CB rig is on a wheelchair.

Save for his radio, Bonner's world is bounded by the walls of a small, white clapboard farmhouse near Arcola, Va. A swimming pool accident nine years ago left him paralyzed from the waist down.

His boyhood nickname "Jarhead," a label once applied to Marine Corps mules, is Bonner's handle as he fills otherwise idle hours day and night "ratchet-jawing" with other CB'ers.

"I've made a lot of friends on the radio," Bonner says. "I'd go nuts without it."

The Lions Club in nearby Clifton is trying to raise money to buy Bonner's family a special \$11,000 van with a hydraulic lift for wheelchairs. The club is planning a barbecue, yard sales and other events, but acknowledges it needs outside help, such as a gift from a foundation.

Some months ago Northern Virginia CB enthusiasts had set up a "Lynn Bonner Fund." They raised about \$500 before the effort stalled.

Bonner is not getting his hopes up. He has been disappointed before.

A blue-eyed youth with curly blond hair and a wispy beard, Bonner spends most of his waking hours in a motorized wheel chair.

Bonner calls his chair the "wheelie mobile" because it is fitted with a portable CB set to keep him in touch with the world outside when he is away from the radio base station in his bedroom.

He nudges the "joy stick" steering control with one twisted hand and fairly zips through doors and between pieces of furniture. And he can manage to push the microphone button to talk on the radio.

Virtually everything else, however, must be done for him by someone else.

When Bonner wants a drink, someone puts a can with a long, long straw in a holder on the wheelchair. When he wants a cigarette, someone lights it for him and puts it in his mouth.

"If I don't light it for him, he can get in the kitchen and sort of bang around

on the stove a little bit and light it like that, but I don't like for him to do that," says Mrs. Nell Bonner, his mother.

Bonner longs for a taste of the world he knew before he dived into a swimming pool, hit his head on the bottom and injured three vertebrae.

Trips outside the house are rare. Someone must lift him into a car, dismantle the 200-pound wheel chair and pack it in the car. At each stop, the process must be reversed.

Bonner's father, Darrell, works double shifts as manager of a Washington, D.C., restaurant to cope with a \$30,000 hospital bill that is only half paid. He is rarely around to manage the lifting and dismantling chores.

Mrs. Nell Bonner, a slight woman of 5 feet 4 inches, is not strong enough to move her son and his chair by herself.

Two years ago the Bonners thought of getting a van equipped with a power lift. Then they learned the price — \$6,500 for the van, \$3,500 for the hydraulic lift, \$800 for modifications to give the van an extra high roof.

"We didn't look any more, because that was sort of a show stopper," said Mrs. Bonner.

Flagstaff CBers' Vigil Helps Motorists

The storm is growing worse and the motorist passing through the Flagstaff area wonders how bad the roads are.

If he is like a large number of motorists, he has a citizens band radio and will request a "break 19 for a road condition report."

Chances are he will reach Quick Draw, Crazy Joe, Touche, Bushwacker, Big Nasty, Space Case, No. 1 Snake, Zorro or one of the other 50 base stations that participate in the "Met Watch" system.

Since it began last winter, Met Watch has provided up-to-date road and weather condition reports and other information travelers need during adverse weather conditions. It also routes emergency information to authorities.

Quick Draw is Lance Johnson and he operates one of the more active base stations here and is becoming well-known among traveling CBers for his "directory assistance" service.

As a residential designer and draftsman, Johnson works in his home and monitors his CB daily for 12-hour stretches.

He was instrumental in forming the Met Watch, which began as an idea by "Crazy Joe" Lloyd.

"We want to make sure there's always at least one base station standing by on channel 19," said Johnson. Now, he said, the bases monitor channel 21 to pass along city road information, and channel 19 for highway information.

The operators are striving for 24-hour monitoring, but sometimes a gap exists between 2 a.m. and 6 a.m.

While Met Watch—short for meteorological, operates primarily during storm conditions, returning travelers often will ask a Met Watch base for other information.

Last summer, Johnson noted, he was on the air up to 18 hours a day providing directory assistance for travelers. "I got to know the town real well," said Johnson, 38, a four-year resident.

Normally, Quick Draw—"the fastest draftsman in northern Arizona"—monitors the radio from 8 a.m. to 8 p.m., but at times during bad weather, "I've

been on from 6 a.m. to 2 a.m. if I couldn't find another base."

Johnson is now organizing a network of CB bases throughout northern Arizona to assist law enforcement agencies in such areas as search and rescue, and locating stolen vehicles. With a large number of truckers and other motorists passing along the information, he explains, chances are a stolen vehicle can be quickly spotted.

Johnson has passed on accident information to authorities, obtained help for persons stranded in the nearby mountain areas and relayed messages to authorities.

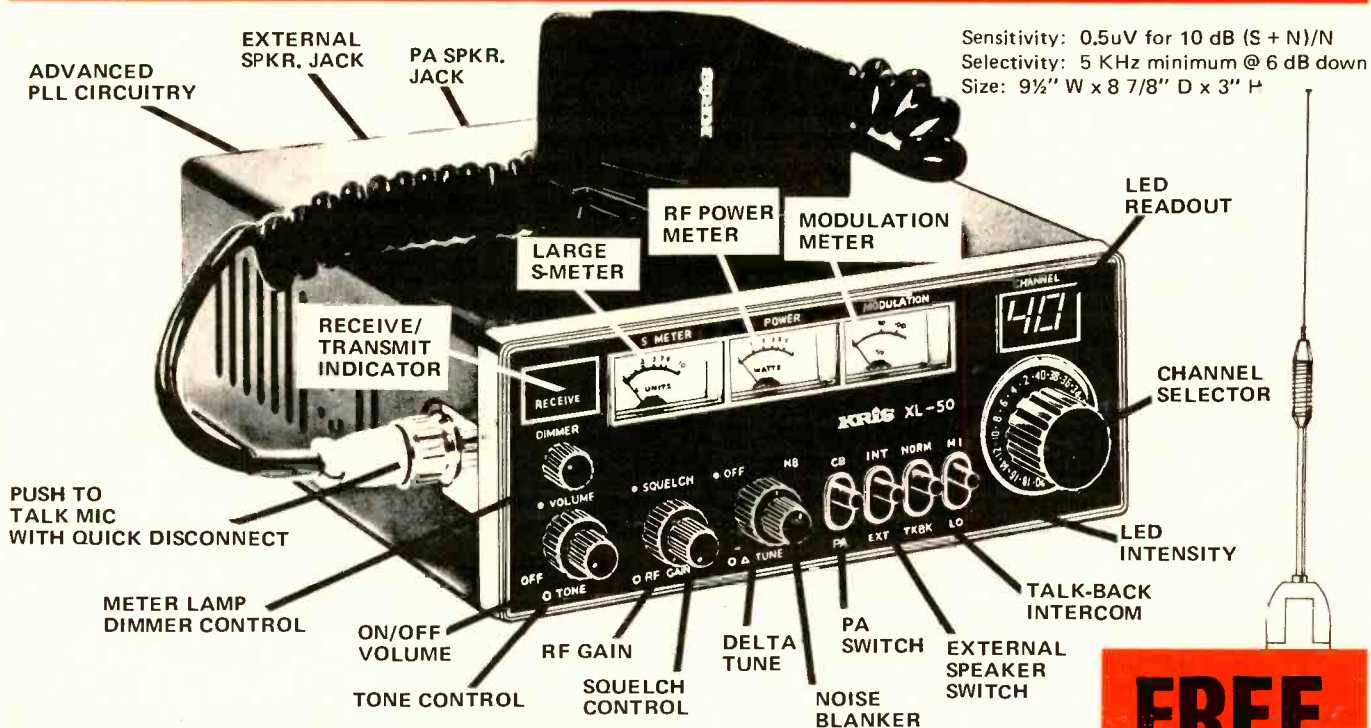
During tourist season, Quick Draw responds to as many as 50 "breaks" a day for information, and has attempted to improve weather reporting by contacting other communities via CB relays.

What is the attraction for spending long hours each day on the CB?

"It's being able to help people," Johnson says, "and it's an ego boost."

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Minnesota Smokies Like CB!

The woman motorist's plea for help came across on Citizens Band Channel 9—the emergency frequency—and was heard by the State Patrol Communications Center in Duluth.

The woman said she was having a seizure and needed assistance immediately. She gave her location, and a state trooper was sent to the scene. The woman was found lying on the floor of her car and was rushed to a hospital.

In another incident, a CB operator reported on Channel 9 that a car was traveling north on U.S. Hwy. 169 with a man riding on the hood and drinking beer. The auto was going about 65 miles an hour and was weaving in and out of traffic, the CBer said.

A state trooper got the call, turned around and stopped the car. He found three open bottles in the vehicle, and the man on the hood was cited for littering after he threw a beer can into a ditch.

The events illustrate the growing role and acceptance of CB radio in the work of the Minnesota State Patrol. Once the scourge of police because of its use in warning motorists of the location of State Patrol squads, the CB now is seen as an asset in law enforcement.

"It gives us so many more sets of eyes, especially in aiding disabled motorists," Lt. Col. Gerald Kittridge, assistant chief of the State Patrol, said recently.

"When CBs first came on the scene, the comments over the air certainly bothered police. They were circumventing our weigh stations and all. But they have provided us a chance to render a better and faster service to the motoring public. I think the good far overrides the bad," he said.

In January alone, state troopers received 125 CB calls about possible traffic violations and made 46 arrests in response. In addition, there were more than 600 reports of dangerous conditions or requests for assistance.

So far, 127 of the State Patrol's 504 patrol cars are equipped with CB radios. All but 11 of the radios were purchased by the troopers with their own money and installed in the squad cars with the permission of the patrol, according to Gary Kollman, the patrol's radio communications coordinator.

Currently, the patrol is seeking a \$52,000 grant to install and maintain 150 additional CB radios in squad cars. Each of the patrol's 11 dispatching centers around the state has had a CB base unit and has monitored Channel 9 for about a year.

"We've had some difficulties with CBers failing to recognize what they're seeking—stalled cars reported as being accidents . . . things like that. Also, in some instances, CBers have converged on the scenes of accidents and created some traffic problems," Kollman said.

However, only 10 per cent of the calls monitored in January on Channel 9 turned out to be false or unfounded reports, he said.

Because only a fourth of State Patrol squads have CB units, "it's unreasonable for the public to expect to be able to contact a trooper by CB at any time," Kollman said.

He suggested that CB operators unable to reach the patrol by radio can contact any CB base station and ask them to have a telephone operator call Zenith 7000, the patrol's toll-free telephone number.

Here are other examples of incidents in which the patrol has been assisted by CB radio:

On Aug. 11, 1976, the patrol's dispatching center at Duluth received a distress call on CB Channel 9. The "May Day" call reported that a 21-foot pleasure boat on Lake Superior was in danger of sinking in high winds and waves.

The patrol radio operator notified the Coast Guard and maintained contact with the endangered boat, securing compass readings from the draft and directing the Coast Guard to the location. The Coast Guard rescued the three persons aboard the boat.

A motorist called the patrol's Brainerd Communications Center on Channel 9, saying he was en route to a hospital with a child who had stopped breathing. The patrol notified the hospital, but a short time later the same motorist called again and said his car had broken down. The Baxter Police Department was notified of the situation. Officers located the vehicle and rushed the child to the hospital while performing mouth-to-mouth resuscitation. The child was saved.

A CB operator reported over Channel 9 that a motorist near Fairmont was driving erratically. A trooper responded and stopped the woman driver. The trooper could see no drugs or alcohol in the car but got the name of the driver's husband and called him in the Twin Cities. The husband said his wife had taken barbiturates in a suicide attempt. The woman was rushed to a hospital and treated.

A trooper driving his own CB-equipped car monitored the voice of a motorist who sounded very young and under the influence of alcohol. The young CBer gave his location, and the trooper went to the scene. He learned that the driver was indeed a juvenile who had been drinking.

A CB operator reported there were two men crawling around on their hands and knees on the freeway on a January night when it was 30 degrees below zero. A trooper found the men, who had been drinking. They were taken to a hospital, where a doctor said they wouldn't have lived much longer without treatment.

A patrol base station monitored a call from a CBer who said a man was beating up a woman along the highway. A trooper was dispatched, but the CBer called again and said the suspect was driving away. The CBer said he would follow the car and arranged to signal the trooper, who was coming from opposite direction, by blinking his headlights. The trooper saw the CBers lights, then arrested a suspect for driving under the influence of alcohol. A subsequent check determined he was wanted for forgery in Nevada. The suspect's woman companion did not press assault charges.

A Carlton County deputy sheriff informed CBers over Channel 9 that a stolen car was believed traveling south on I-35 and asked if anyone had seen it. He immediately got a reply from a CB operator who said a vehicle matching the description of the stolen auto was two miles south of him and speeding. Subsequently, several CBers reported seeing the stolen car along the freeway. Two Pine County squads and a patrol car eventually overtook and stopped the suspect vehicle.

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"If they were paid by the hour, the county would be indebted to them for many thousands of dollars, but this is all volunteer work, he continued. Getting involved in all kinds of projects is their business," he said.

The REACT assists the Sheriff's department, fire departments, flood victims, weather disaster victims, stranded travelers, children, fairs, traffic, oldsters any many in between.

If you're ever in need of a helping hand, give the Spencer County REACT a call!

ZANY CB NOVELTY SWEEPS NATION!

The whims, likes and dislikes of any given group of people are hard to predict and anticipate, but when they came up with the *Pet Transistor* they seemed to touch right at the center of the funny-bone of the CB'ers of the world!

Pet Transistors, conceived with the communications buff in mind, seem to be making appearances at many CB gatherings, coffee breaks and club meetings. And while it's difficult to find very many things funnier than club members yelling *Mr. Chairman, I rise on a point of order*, somehow a couple of *Pet Transistors* circulating through the audience manage to liven up the proceedings by about 377%.

As a result, the popularity of *Pet Transistors* has been astonishing; most likely helped along by the outrageous

and hilarious printed "instructions" which accompany each *Pet Transistor*.

Pet Transistors were the brainstorm of a bright young CB'er with the handle SUNSHINE, and SUNSHINE probably has been seeing very little sunshine this winter while filling the demands for *Pet Transistors* which have been pouring in from throughout CB land, increased by the fact that they make great holiday gifts for anybody involved in communications or electronics. Of course it is probably no small coincidence that their low price has aided too; there are few other CB'ers holiday gifts you can get for \$2, or 2 for \$3, postpaid!

Pet Transistors come from Sunshine Radio, 18 Boat Lane, Port Washington, N.Y. 11050.

Growing Up—One Step At A Time

AM operators have frequently looked at the example set by the majority of Sideband operators who have made a valiant effort to maintain a predetermined level of "professionalism" in their approach to operating. Far from taking away from the enjoyment of talking on 11 Meters, their efforts have paid off by eliminating from the Sideband channels much of the image of being a disorganized patchwork of operators, such as has plagued AM operators over the years.

One of the first impressions the new listener to a Sideband channel gets is of *togetherness*, this is based upon the universal Sideband use of ID numbers instead of so-called CB *handles*.

On the other hand, for a long time all you heard on the AM channels were stations with such varied and wide ranging identifications as MULE EARS, BEER BOY, DIZZY DAME, GEAR JAMMER, and the like. Some handles were funny, some were difficult to pro-

nounce or copy, more than a few were blush-provoking. In general, the use of handles has *not* done any beneficial service to the cause of CB in the media or the eyes of the general public, in fact it has brought a bit more ridicule in our direction than we needed or deserved, considering the many public service deeds performed by CB operators. However, even public safety and service agencies have been known to become a little unhappy when faced with the prospects of accepting help from a person whose description of himself is MULE EARS or BEER BOY.

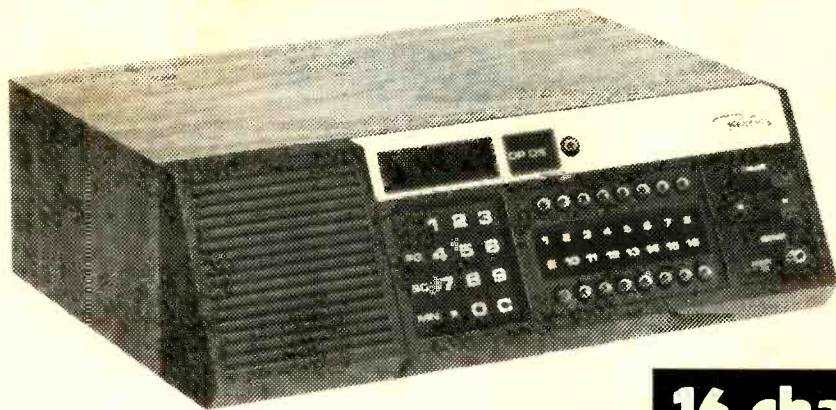
As a result, many AM operators have sought to utilize a form of identification which is more suitable (and easy to copy) than a handle. This has sparked the constantly increasing use of Unit Number identifications, which (according to the FCC rules) are permitted to be used under the very same regulations allowing the use of handles, or Sideband ID numbers. Those rules state that so long as the official FCC

callsign is announced, the operator may also use "a unit designator" (95.95b).

Operators wishing to obtain their registered Unit Number identification, or register an existing one, have made contact with the central registry of Unit Numbers, which also publishes an excellent guide to how to properly use Unit Numbers and get the most out of CB through their use.

Further information on this may be obtained by sending a self-addressed *stamped* envelope to Z-Tech Enterprises, P.O. Box 70-NW, Hauppauge, N.Y. 11787.

The use of Unit Numbers may not be the solution to the patchwork quilt appearance of the AM channels, but it's a sure step in the right direction—and the next time you hear an operator announcing UNIT 708, or UNIT 227-DELTA, or UNIT 1264—you'll know that you're tuned in on an operator who's tuned in on a better image for all CB operators!



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CB NEWSWIRE

Maine Pilot Talked In By CB!

A physician gave Bangor air traffic controllers 90 nervous minutes as he circled over Bangor International Airport in the fog. His Cessna 172 was equipped only with a compass, an artificial horizon and a CB radio.

Dr. Harry Lowell was on his weekly flight from Biddeford to Bingham when visibility dropped to near zero. His plane's regular radio was out for repairs. Lowell flies to Bingham to see patients. There is no regular physician there.

He left Biddeford at 6:30 p.m. By 7:30 he was lost somewhere over Skowhegan. Because he was overdue, Jim Hilton at the Bingham airport called Augusta Flight Service, which in turn called a regional air traffic control center in Nashua, N.H., which called Bangor.

"I spotted him right away in my scopes," said Terry Morancie, assistant chief air traffic controller at BIA.

If finding Lowell was relatively easy, getting him down to the ground was not. The Bangor tower couldn't talk with Lowell on his CB radio. Morancie called the state police, which sent a cruiser equipped with the right radio. Trooper Robert Cameron parked his car outside the BIA control building.

Morancie climbed in and spoke with Lowell on the CB.

Inside the control center, meanwhile, controller Arthur Brooks watched the screen, telling Morancie over a portable unit which way he should tell the pilot to turn. Morancie's CB (in the police car) wasn't powerful enough to reach the plane some of the time, so its signal was relayed through a CB ground station manned by Dave Brooks of Kenduskeag.

On the screen, Lowell's plane was a small blip, turning this way and that as he did his best to respond to commands from the ground. By about 8:45 the pilot said he could see some lights from Bangor. By 9 p.m. he could see the runway, he reported to Morancie. By about 9:20 he was on the ground.

Everyone—the controllers at the screens, Morancie and Cameron in the police car, the airport fire department personnel standing by at the runway, four members of Dirigo Search and Rescue who had been standing by to help with communications—breathed an audible sigh of relief.

"I was pretty uptight," a pale-looking Dr. Lowell said later. "Once I saw those runway lights, well, after that, it was okay."

Morancie asked him if he had any experience in instrument flying. "I had plenty tonight," Lowell replied.

Five aircraft, mostly commercial flights, were delayed on the ground during the 90 minutes it took to get Lowell back on the ground. Morancie said there were no flights in the air waiting to land, but that one light aircraft piloted by Col. John "Pierre" LeBlanc of Bangor took off to see if it could locate Lowell and guide him in. LeBlanc reported that he never saw Lowell, and for a while air controllers suspected that Lowell's lights were out. Lowell said later, however, that they were functioning.

Morancie said the "air surveillance approach," as the talking-down maneuver is called, was completed by about 9:20 p.m. and that everything was back to normal by about 10 p.m.

S. G. Payne, an FAA official in Burlington, Mass., said "He was flying visually," indicating that many pilots are equipped with CB radios and equipment similar to Lowell's. They fly at their own risk.

Payne praised the excellent cooperation among the air traffic controllers, the CB community, and law-enforcement officials during the incident.





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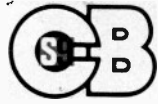
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\$2,500 Raised For Little Boy

People—approximately 1,000 of them—flocked to the three-day coffee break on July 2, 3, and 4. They drank coffee, munched doughnuts, and socialized.

And they contributed \$2,500 for the medical expenses of little Clay Hodge.

Clay, the three-year-old son of Mr. and Mrs. Charles Hodge of Gastonia, N.C., was born with a facial anomaly. This means his forehead was not straight, his nose was completely blocked with bone, and one of his eyes was missing.

So far, he has been in the hospital 13 times in his short life and has had surgery six times. He faces at least 15 more years of surgery and treatment.

The Tarheel CB club engineered the coffee break.

"We did it because the Hodges are our friends and that little boy needed some help," said Roy Freeman, president of the club.

"You wouldn't believe the turnout," he said. "Some people came by and didn't get out of their cars—they just rolled down their car windows and handed out money."

Approximately 60 members of the CB club helped out during the coffee break, he said.

And the club also staged two more events during the three days to add a little more interest and raise a little more money.

One of the events was the raffling off of a riding lawnmower.

The other event was the auctioning off of CBER Steve Noblett's beard. Noblett, who said he had been ribbed for growing the beard, offered it up as a money-raising sacrifice. The beard was shorn and \$30 was added to the pot.

Mrs. Hodge, Clay's mother, was overwhelmed by the success of the CBERs' efforts.

"I just don't know what to say," she said, laughing. "They are a lot of fine people. I don't know how in the world they did all they did."

"Thank you, sounds so mild, when you want it to mean so much, but all I can think to say is, 'thank you, thank you, thank you.'"

Ill. State Police Hope CBs Will Save Lives

Illinois State Police Supt. Lynn Baird said that he is convinced that a \$190,000 program to equip state police cars with CB radios will help save lives in traffic and farm accidents.

The program, which began last September, was funded with a \$190,000 federal highway safety grant allowing the purchase of CB radios for its 1,600 patrol cars and 58 base stations throughout the state of Illinois. The radios are expected to be installed by no later than the end of September in all state police cars. Motorists with citizens' band radios will be able to contact police or volunteer groups on the emergency frequency when they spot an accident. Troopers will also be able to monitor conversations occurring between drivers on the highways with the new radios, according to Cpl. Everitt Bane.

Supt. Baird emphasized that state police rules prohibit troopers from attempting to trap drivers. "We're not out there to trap people, we're out there to help people," he said.

He also stated that the rise in popularity of CB radios has had a positive rather than a negative effect on traffic control. "When they monitor our movements, they know that the state police are out there," he said. Two single-engine airplanes will be added to the fleet of three Illinois State Police planes for aerial observations.

Proponents of the program stipulated that the success of the CB venture will depend heavily on volunteers in addition to the state police.

State Police did use CB radios to give traffic advisories for persons near the state fairgrounds during the Illinois State Fair in August.

CB Aerial Hits Wire; One Killed, Five Hurt

A Williamsport, Pa., young woman was electrocuted and five other persons were injured when a citizens band antenna came in contact with a power line.

Miss Sharon A. Laielli, 23, was pronounced dead on arrival at the Jersey Shore Hospital. Dr. Earl R. Miller, Lycoming County coroner, ruled she died of electrocution.

Injured were Miss Laielli's mother, Betty L., and brother, Jeffrey, 14, also of Williamsport. Also hurt were the resident of the mobile home, Ronnie L. Mower, his son, Edward Jr., and Edward H. Fisher and Edward H. Fisher Jr., both of Jersey Shore, neighbors of Mower.

Mrs. Laielli, Jeffrey Laielli and Mower were all reported in fair condition in Jersey Shore Hospital with burns of the hands and feet. The Fishers were treated at the same hospital for burns.

The group was attempting to erect an antenna for a citizens band radio alongside the mobile home when the top of the antenna struck power lines overhead, causing a shock which

knocked all six persons unconscious, state police said.

A neighbor, Susan Keith, called for an ambulance when she looked out her window and saw the people lying on the ground. State police said it is not known how much time had elapsed from the time of the shock until the alarm was called in.

Citizens Hose Co., of Jersey Shore, dispatched three ambulances to the scene to take the injured to the hospital.

Fisher said he and his son were coming home to the trailer park when they noticed Mower, and the Laiellis, friends of Mower, putting up the antenna.

According to Fisher, he stopped and he and his son were helping erect the antenna when the electrical shock occurred.

Fisher said his son and Mower were standing on the roof of the mobile home as the other four were pushing and holding the antenna. According to Fisher, the top of the antenna struck the overhead power lines, knocking everyone to the ground.

Police noted that the power line carried 7,200 volts.

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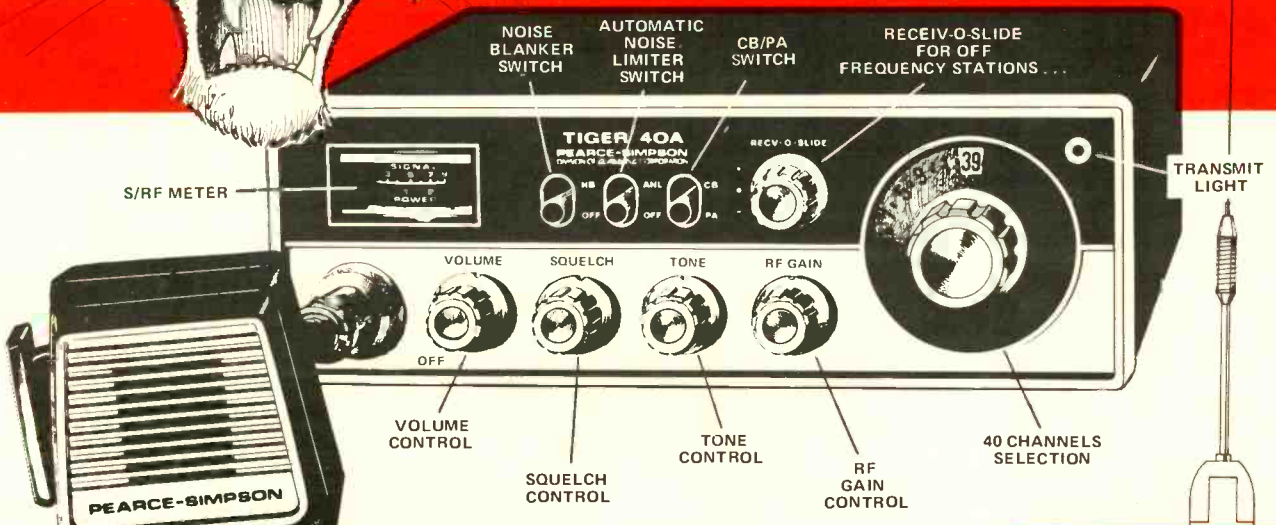
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"CB Subculture" Under Study

Citizens Band radio users across the country may soon be contacted by someone wishing to speak with them—by telephone or in person, not by channel 1 through 40 on their CB's.

During the next year, a research team from the University of Denver will be conducting a study of citizen band use, part of which involves interviewing users and others having a stake in the "CB subculture."

"It really has become a subculture," said Dr. Floyd Shoemaker, principle investigator in the study and member of the University's Denver Research Institute. "CB users have their own language, symbolism and behavior, just like any culture."

Aided by a research team from the institute, and the University's mass communications and sociology departments, Shoemaker intends to find out who uses CB, how it is used, what personal needs it fulfills and what the behavioral and social consequences of CB use are in the U.S.

"Basically, we want to find out why people use CB," Shoemaker said. "Some people say it fulfills the need

for social interaction with no commitment, but some conversations conducted by CB users have sprung into face-to-face friendships."

Although the trucker's strike in 1973 greatly increased CB use and it rapidly became a popular subject in movies and television, there is little factual evidence on the impact of CB on society, Shoemaker said.

"Part of this is because many scientists think CB is a fad and will disappear when society becomes saturated with the novelty," Shoemaker said. "Although previous studies that have been done allude to CB's impact, we want to substantiate it."

To do this, part of the field experiment in the study will investigate use of CB during disasters, said Shoemaker.

"From natural disasters which occur in the United States in the next year, we will select one disaster for intensive study," he said. "We will explore CB use during the disaster—whether it is orderly and helpful or chaotic and not helpful at all."

Dr. Thomas Drabeck, chairman of the University's Sociology Department, will supervise data collection for the

disaster study, which Shoemaker said should be a significant part of the research project.

"We searched intensively and found no previous studies of this type ever done before," he said.

Also to be studied is the effect of CB use upon car radio and tape listening, which Shoemaker said may be significant.

"Sales figures presently indicate that in-car tape decks are declining in use in the U.S., which may or may not be due to the impact of CB radios," he said. "Also, if people are not listening to the car radio as much as they used to this will have consequences for radio advertisers."

Funding the study is a \$136,100 grant from the National Science Foundation. Other costs will be shared by the University.

When results of the study are tabulated, Shoemaker said, they will be distributed to all having a stake in CB, including CB owners and manufacturers, radio and T.V. broadcasters, and researchers in telecommunication, mass communication, and related fields.

Michigan CB Radio Emergency Network Urged To Assist Police

A Lansing man who says he owes his life to Citizen's Band radio and a husband and wife team from Flint are forging a statewide CB network to help police fight crime and perform traffic duties.

Dennis Beckner said a statewide network linking trained CBers with police agencies could help police handle emergencies, give broader protection and save lives.

Beckner, the civilian administrator of a CB group working with police in Ingham, Eaton and Clifton counties, said he and Bob and Mercedes Ashley of Flint are promoting the program.

So far, they have standardized the Lansing-based CB group with a similar organization to which the Ashleys belong in Genesee County. In all, there are CB groups operating in about 20 other Michigan counties.

Beckner said if these groups are coordinated and new groups are formed in the remaining counties, police could benefit from a statewide citizens force.

"Then in an emergency police would have people across the state who are similarly trained to work with," he said.

Beckner said if he hadn't had a CB in his car when he once was stranded and in dire need of medicine, he would be dead now.

"It saved my life and the least I can do is help pay it back by helping others," he said.

The Lansing area group he heads, called the Community Radio Watch, has 300 members. Each takes a 15-hour, police-directed course in search and rescue operations, weather spotting and proper ways to rely emergency calls. First aid techniques also are taught.

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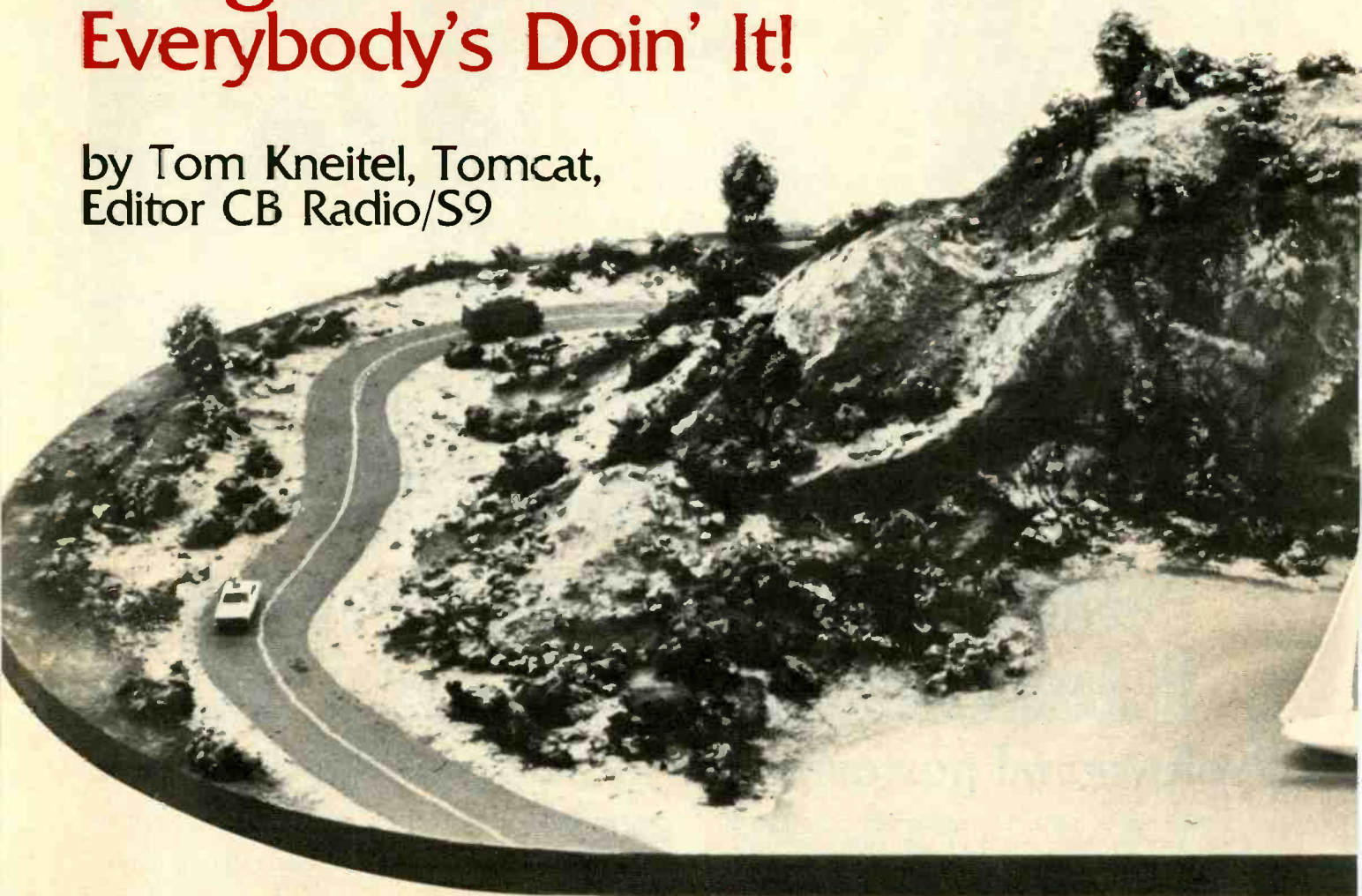
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REPEATERS: Will They Come to CB?

Range-Extending via the “Magic Machine” — Everybody’s Doin’ It!

by Tom Kneitel, Tomcat,
Editor CB Radio/S9



FROM time to time we hear rumors of the FCC “opening up” some VHF or UHF channel space for the purposes of giving CB radio some elbow room—such thoughts have always caused no small amount of excitement in CB circles for they conjure images of exotic new frequencies and methods of operation. And rightly so, for VHF and UHF frequencies are all starting to buzz with *repeater* activity—and that includes public safety stations, mobile telephone stations, hams, business and industrial stations. Even the former

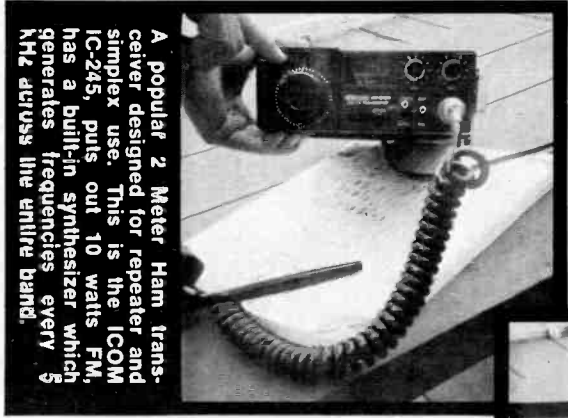
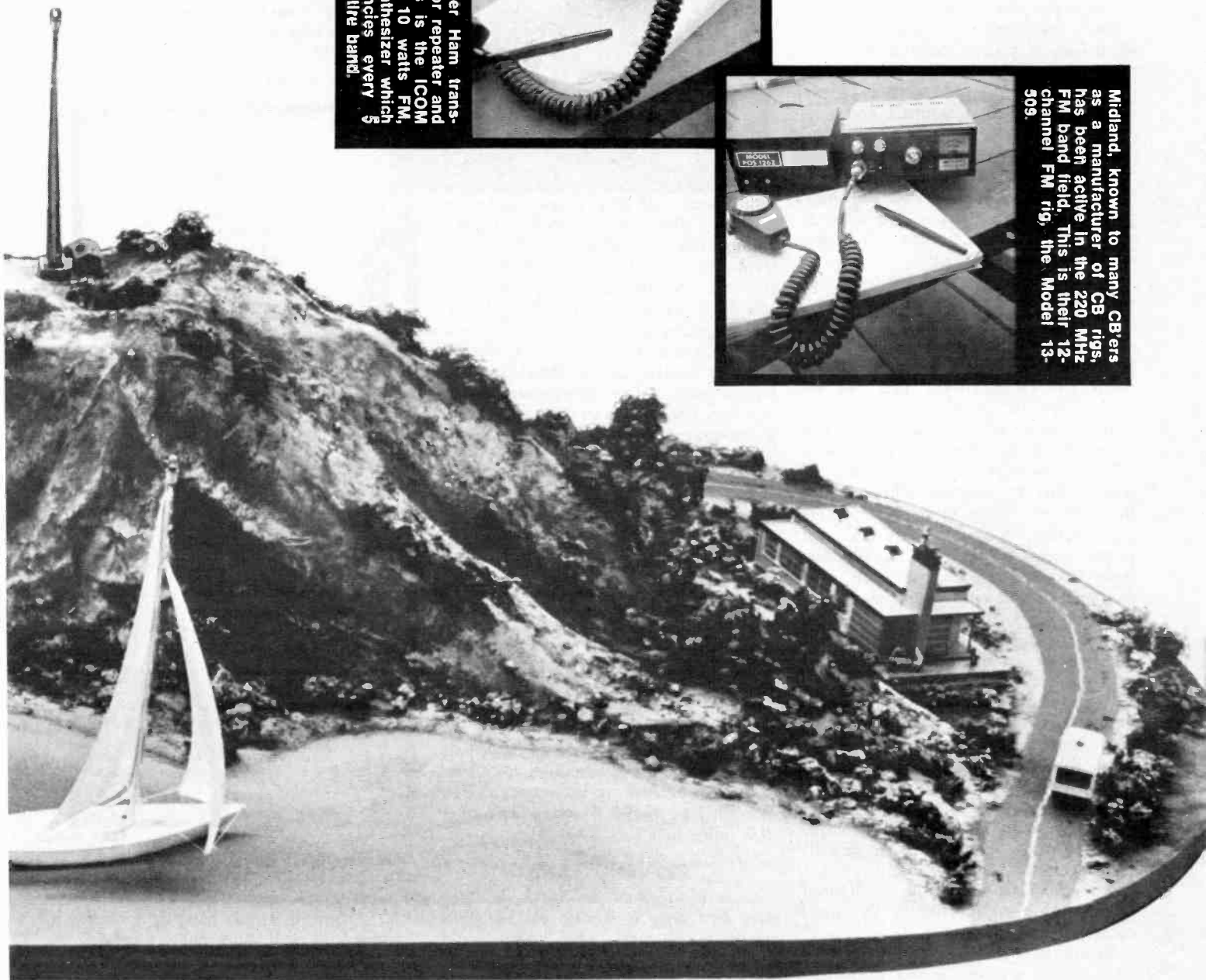
Class A CB (now dressed up with a new name, General Mobile Radio Service—GMRS for short) on 462 MHz is wall-to-wall with repeaters!

The FCC, so say the rumors, still has their Communicator Class (no code) Ham radio license sitting on the sidelines and under consideration. If *that* license goes through it will undoubtedly have a great deal of appeal to present CB’ers. And what would such a grade of Ham license offer to its users—you guessed it—the opportunity to use repeaters; our prediction is that, should

such a license come to pass, it would grant operating privileges in Ham bands presently situated at 220 to 225 MHz and 420 to 450 MHz, which are already starting to be populated with repeaters!

WHAT IS THE MAGIC MACHINE?

All this excitement seems to zero-in on repeaters, popularly called by some *machines*. It does seem that one way or another, one fine day, *you* will be given the opportunity to hook your signal to one of these gizmos.



A popular 2 Meter Ham transmitter designed for repeater and simplex use. This is the ICOM IC-245, puts out 10 watts FM, has a built-in synthesizer which generates frequencies every 5 KHz across the entire band.



Midland, known to many CB'ers as a manufacturer of CB rigs, has been active in the 220 MHz FM band field. This is their 12-channel FM rig, the Model 13-509.

Whole books have been devoted to the subject of repeaters, and there's no point in trying to condense such a complex topic into one magazine story, but we can get a general overview of the subject so that when you are faced with the prospect of availing yourself of working with them—you'll have a grip on the subject.

Unlike many of the things which you come across in communications which have mystifying names which do little to explain themselves to the non-technical "outsider" (such as colinear an-

tennas, solid state devices, etc.) repeaters are *well* named—for their function is to repeat; it's as simple as that! In doing so, they permit greatly extended communications between relatively low powered stations at fixed locations or in mobile units.

A repeater is a combination transmitter and receiver installation, it is usually located at a spot which is especially well suited to long range VHF or UHF transmission and reception, such as a mountain top or tall building. Some repeaters have their antennas

piggybacked on large towers used primarily for AM or TV broadcasting, and a single broadcasting tower may actually accommodate many different repeater antennas from various licensees in differing radio services.

The repeater, located in an advantageous spot, then has the ability to communicate over far greater distances than transceivers using direct, non-repeater (called *simplex*) methods, such as are employed on 27 MHz CB. Repeaters, however, require more than one frequency to do their thing—the

exclusive direct (simplex) frequencies available to the operator who wants to try a hand at such techniques.

The repeaters on the 2-meter band are (with some exceptions) established on 24 pairs of channels, while simplex operations are more often than not to be encountered on 11 frequencies which have been voluntarily set aside for such purposes. (See Fig. 2).

Such "channelizing" of the 2-meter band has, of course, been a new concept for the hams since ham communications (in pre-repeater days) were established on assorted and randomly selected VFO (variable frequency oscillator) frequencies within the confines of the various available bands. But today's 2-meter FM ham gear is usually set up with a channel selector switch not unlike what you might find on a CB rig.

There are some 2-meter ham rigs which require plug-in crystals for anywhere from 10 to 25 pre-determined channels, while others have a built-in synthesizer to generate a frequency every 5 or 10 kHz right from one end of the band to the other!

Hams have usually approached the operation of repeaters as a club effort, with members of a particular club all paying dues to purchase and maintain the repeater. Many of these repeaters are so-called *open* repeaters and will permit access to the machine from any body within range to use—even non-members of the club which owns/and operates the machine; however there are also a number of *closed* repeaters which are intended for the private and exclusive use of club members.

A closed repeater is equipped with a tone device which has to be matched with similar devices set to a particular sub-audible frequency gizmo installed in the transceivers of all members. When a *member* transmits, the repeater reacts. When a non-member attempts to activate the repeater, his signal falls upon deaf ears. Actually, there are several methods of maintaining a limited access repeater, but this is the most common.

In actual operation, communications over a ham repeater sound quite different and apart from what you might hear when monitoring some of the low frequency ham bands such as 15 or 20-meters. You don't hear anybody calling "CQ," and that is perhaps *one* of the more startling things to assail the ears of the newcomer to those frequencies. Stations simply come on the air and announce their FCC assigned callsign followed by the word "listening;" anybody else on the frequency who hears the call, picks it up!

Since there are so many repeaters now on the air on the 2-meter band, it is not uncommon at certain locations



for several different repeaters to be heard on the same frequency. In fact, an operator may even find that when trying to communicate through local *Repeater A*, he may also (unintentionally) trigger distant *Repeater B* and *Repeater C* on the air. Some operators have found that they can eliminate this by the use of directional antennas and/or low power—and many 2-meter FM rigs permit operation at 2 different power output levels. On the other hand, many operators have a ball by using a beam and high power to activate a repeater far off into the distance (on a locally clear frequency) and work the operators who are local to that repeater.

Just as an example of what can be done with a 2-meter FM repeater; I have had solid communications through a repeater located on top of Mt. Tom, near Holyoke, Mass., which is more than 100 air miles from my location. This has been accomplished with a 10 watt rig using an omni-directional antenna. Such communications have permitted a number of channels to talk to operators located as far away as Mt. Washington, N.H., which is well over 200 miles into the distance!

220 MHZ BAND

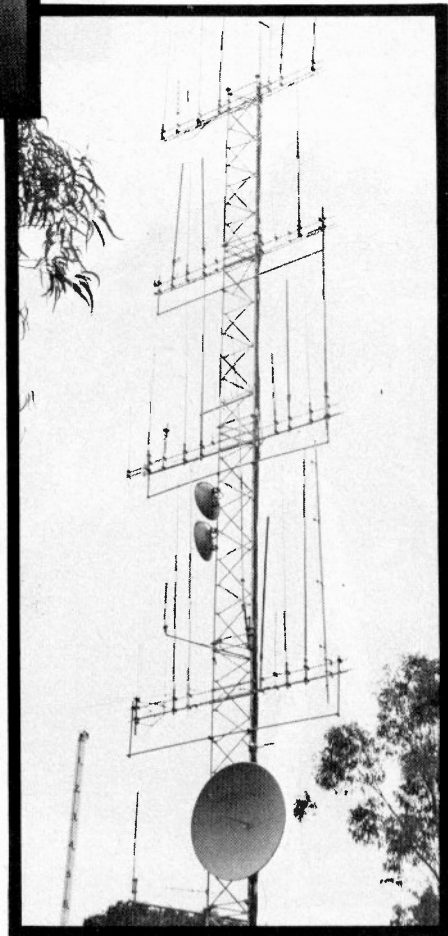
This is *the band to watch*, so they say! Not only is it one of the spots where a no-code ham ticket *could* eventually blossom out, this frequency range has also been speculated as a possible location for additional CB channels. Furthermore, many hams seeking new frontiers have started migrating there because of the fact that the 2-meter band has become so popular and populated. In fact, there are a number of repeaters already in operation on 220 and more seem to be cropping up each day.

Equipment is also becoming a bit more easy to obtain as a number of manufacturers have started to climb upon the 220 bandwagon as it starts to get underway.

My own experiments have indicated

Formerly the stomping ground of the build-it-yourself crowd, the 450 MHz FM Ham band is now represented by companies such as Regency with this nifty 12-channel rig, all set for the growing repeater boom on that band.

Below: A repeater tower in all of its glory. One tower may be shared by a number of different repeaters in a wide variety of radio services.



that the communications range to be expected on this band, using similar equipments, is roughly equal to 2-meter FM, except that the band is far less crowded at this time than 2-meters. Not only do you get a chance to yak longer because there are fewer operators trying to use the repeater, there are more chances to get a good DX shot at a distant repeater without triggering on a local one.

The 220 MHz band is presently established with 27 repeater paired frequencies, plus 13 simplex frequencies. (Fig. 3)

UHF

The GMRS and the 450 MHz ham band frequencies are established so close to one another that you could draw similar conclusions as to the performance results which might be ex-

usual compliment is 2 frequencies, more often than not in what amounts to matched pairs of channels which have become rather standardized. One of the channels is the repeater's input (or *talk-in*) frequency, which is used to receive distant stations. The other channel is the output frequency, which is used by the distant stations to receive the repeater's signal. The repeater is then sort of a *middle man* in the communications between distant stations which are located at points too far apart for direct communications to be practical.

What this means is that if a certain repeater has a range of say 50 miles in all directions (transmitting and receiving), it can pick up a mobile signal from 50 miles to its east and retransmit it so that communications can be made with another mobile unit 50 miles to its west—a total distance of 100 miles! By using direct or simplex methods, such mobiles might well have been able to communicate with one another only within a range of 10 to 15 miles.

Presently, repeaters are used in conjunction with FM systems.

A diagram showing how a typical repeater system would operate is shown in Figure 1. The repeater is automatically keyed on the air when it receives a signal on its input frequency.

The signal may come from one of its associated mobile units, or from a fixed-location control (or *base*) station; several fixed locations may be employed in one repeater system.

Secondarily, some communications systems employing repeaters are designed to also permit the mobile units and control stations to communicate with one another directly, via simplex, on the repeater input frequency. While this, at first, may seem to be defeating the purpose of the repeater, in actuality it is worthwhile since it may be the case that two mobile units are within a mile or so of one another and do not require the services of the repeater in order to establish communications—leaving it free for others to use. Some transceivers are equipped with a power reduction switch to drop their transmitting power so low (say from 10 watts to 1 watt) that the repeater will not key-on from their reduced power signal, and they can have short range communications exclusive of the repeater. Such a feature is used by many law enforcement agencies for stakeout communications.

TRICKS OF THE TRADE

Since a repeater involves a considerable cash outlay (take into account the repeater itself, the antenna, the tower,

the building to house the repeater, cost of locating the repeater atop of a mountain or building including possible rental of location site, maintenance, etc.), repeaters are frequently shared by several different users, who split the costs of operating the machine, this is rather common in the business radio services and is also permitted in the GMRS service. The ham operators have an approach to doing this too—more about that later!

In instances where a repeater is shared by several different users, it may be that *Wally's Fuel Delivery* is not interested in hearing the communications relating to *Joe's Pizza Parlor* or the *Acme Veterinerian Hospital* which also take place via the same repeater. In that case they can obtain equipment which has sub-audible tones superimposed under the voice transmissions. While these tones cannot be heard by the human ear, the transceivers can detect them and will remain silent (the squelch will not activate) except for those selected transmissions from other units within *Wally's Fuel Delivery* system which are coded with that particular tone.

Many repeaters are equipped to permit mobile units to make landline calls through their facilities; this is even permitted over Ham band repeaters

A new breakthrough on the 220 MHz FM band is this Midland 13-513, which offers 1,000 synthesized frequencies.

Below: Today, many business users of 2-way radio have learned that they can greatly expand their communications range by using repeaters. It's a trick learned long ago by hams and public safety communicators.



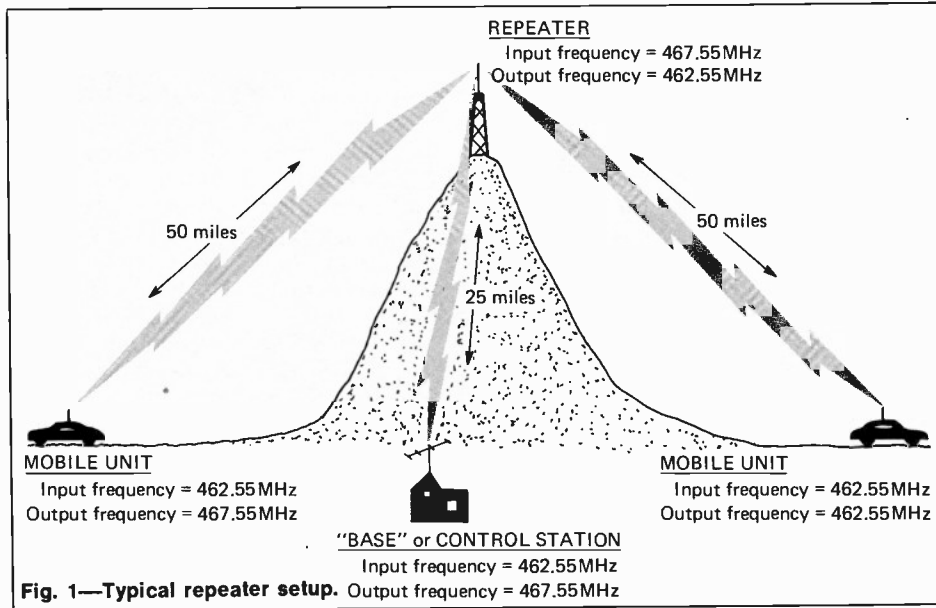
(although on the Ham bands one may not place business calls through the repeaters).

APPLICATIONS OF REPEATERS

Ham operators have innovated all manner of repeater techniques, and the world of FM repeaters on the very popular 2-meter band (at 144 to 146 MHz) is both exciting and fascinating. Presently you can operate in this band with all grades of Ham tickets except for Novice. Equipment is plentiful, there are repeaters galore, and the fun is endless. There are also a number of

Handy Chart of Most Popular Repeater Frequencies

(Tear Out and Save)



2 Meter Ham Repeater Pairs

Inputs	Outputs	Inputs	Outputs
146.01	146.61	146.37	146.97
146.04	146.64	147.69	147.09
146.07	146.67	147.72	147.12
146.10	146.70	147.75	147.15
146.13	146.73	147.78	147.18
146.16	146.76	147.81	147.21
146.19	146.79	147.84	147.24
146.22	146.82	147.87	147.27
146.25	146.85	147.90	147.30
146.28	146.88	147.93	147.33
146.31	146.91	147.96	147.36
146.34	146.94	147.99	147.39

Fig. 2—The most popular 2-meter ham band FM channels of the repeater pairs, 146.34/146.94 is the most heavily populated.

GMRS Repeater Pairs

Inputs	Outputs
467.550	462.550
467.575	462.575
467.600	462.600
467.625	462.625
467.650	462.650
467.675	462.675
467.700	462.700
467.725	462.725

Fig. 4—The GMRS (formerly the Class A CB Service) has these channel pairs. Mobile units also operate on the repeater output frequencies.

220 MHz Ham Repeater Pairs

Inputs	Outputs
222.34	223.94
222.38	223.98
222.42	224.02
222.46	224.06
222.50	224.10
222.54	224.14
222.58	224.18
222.62	224.22
222.66	224.26
222.70	224.30
222.74	224.34
222.78	224.38
222.82	224.42
222.86	224.46
222.90	224.50
222.94	224.54
222.98	224.58
223.02	224.62
223.06	224.66
223.10	224.70
223.14	224.74
223.18	224.78
223.22	224.82
223.26	224.86
223.30	224.90
223.34	224.94
223.38	224.98

Fig. 3—The 220 MHz ham band FM operations are established as shown above.

450 MHz Ham Repeater Pairs

Inputs	Outputs	Inputs	Outputs
447.05	442.05	448.55	443.55
447.10	442.10	448.60	443.60
447.15	442.15	448.65	443.65
447.20	442.20	448.70	443.70
447.25	442.25	448.75	443.75
447.30	442.30	448.80	443.80
447.35	442.35	448.85	443.85
447.40	442.40	448.90	443.90
447.45	442.45	448.95	443.95
447.50	442.50	449.00	444.00
447.55	442.55	449.05	444.05
447.60	442.60	449.10	444.10
447.65	442.65	449.15	444.15
447.70	442.70	449.20	444.20
447.75	442.75	449.25	444.25
447.80	442.80	449.30	444.30
447.85	442.85	449.35	444.35
447.90	442.90	449.40	444.40
447.95	442.95	449.45	444.45
448.00	443.00	449.50	444.50
448.05	443.05	449.55	444.55
448.10	443.10	449.60	444.60
448.15	443.15	449.65	444.65
448.20	443.20	449.70	444.70
448.25	443.25	449.75	444.75
448.30	443.30	449.80	444.80
448.35	443.35	449.85	444.85
448.40	443.40	449.90	444.90
448.45	443.45	449.95	444.95
448.50	443.50		

Fig. 5—The 450 MHz ham band has more available repeater frequency pairs than any of the other FM bands, however it's still pioneer territory.

pected from this band when using either service with similarly designed installations; I suppose that that would also hold true for UHF business and industrial services. Since I have no license in the GMRS at this time—or in the UHF business radio service, I'll base my observations upon my experience with the 450 MHz ham band.

GMRS and 450 MHz ham operations are both channelized here (Figs. 4 and 5), with 8 frequency pairs used by GMRS stations and 59 pairs established for 450 MHz ham repeaters.

GMRS is currently undergoing a vast expansion with public interest in this service rapidly growing; recently announced equipment for use in this service has brought the formerly high price down to a level which is extremely attractive. License applications are up 185% over last year!

The 450 MHz ham band is more of a slice of pioneer territory than is 220 MHz. Until recently there were next to no repeaters there, and the primary inhabitants of 450 MHz were operators who designed and built their own communications gear, including equipment which sends TV signals. Today, however, it is possible to purchase readily available transceivers for this band, such as one made by *Regency*, which is designed with an eye towards repeater use. This was a good move, since there seems to be a rustle of activity afoot which has resulted in quite a few repeaters being established in the 450 MHz ham band.

Using a 10 watt commercially built transceiver and an omni-directional gain antenna at a fixed location, I found that I could easily trigger repeaters to about 50 miles distant with *full quieting* (that is, a signal of sufficient strength so as to override any internally generated sounds from within the receiver).

I should point out that there are some ham repeater clubs which even operate on the 6-meter (50 MHz) band in larger cities, and some which operate more than one repeater—either

at different locations or on different bands. Some repeaters have further expanded their operational range by placing receiving antennas at distant points so as to pull in mobile signals from far beyond their normal communications range—one repeater in Boston has a receiving antenna about 35 miles away in Nashua, N.H.!

YOU CAN LISTEN

Many of today's scanners are able to pick up some of the frequencies used by repeaters—certainly all scanners having a UHF capability can monitor the GMRS frequencies; that is why we've listed the frequencies here. Some scanners can also receive 2-meter and 450 MHz ham band repeaters, or can be re-peaked by a communications technician to cover these frequencies. So you might want to use your scanner to actually monitor repeaters in action! On the other hand, the likelihood is that if you have monitored any 2-way communications now taking place on the UHF bands, the chances are good that you're actually hearing a repeater.

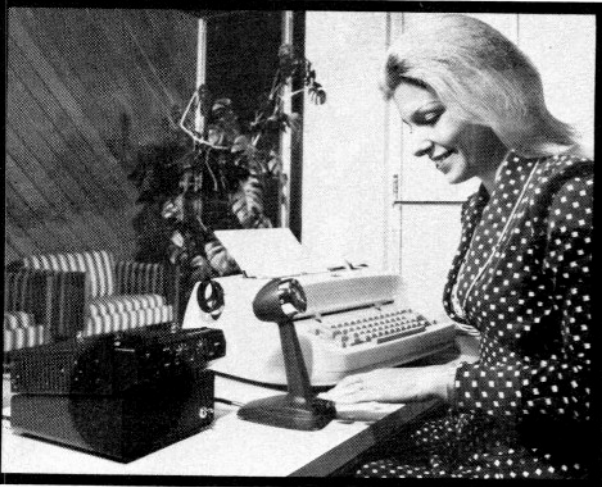
When listening to a repeater, it is necessary to monitor only 1 frequency (the repeater output) in order to hear both sides of a conversation—you need *not* monitor the input frequency.

THERE'S A REPEATER IN YOUR FUTURE

You've probably already spoken through a repeater without even knowing it—a great many long distance *land-line* calls aren't landline at all if you want to get picky about it; it's now being done with large networks of microwave repeaters.

Well, even if you haven't spoken over a repeater yet—if you're involved in *any* way in 2-way communications it does seem certain that someday, somewhere, when you're least expecting it—someone is going to say, *Welcome to the wonderful world of repeaters!*

The GMRS is what they're now calling the old Class A CB band. Suddenly it's gotten very popular, and Standard Communications has met the challenge with base/mobile equipment designed around a repeater concept, and it's a first cousin to CB radio!



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Below: Before you put the John Hancock on the bottom line, make sure you understand the ins-and-outs of the guarantee or warranty, and that you're sure that you are buying the rig you really want!



TOMCAT'S

CONFIDENTIAL REPORT:

Secrets of Shrewd CB Shopping!

They're Your Greenstamps— Why Waste Them?

by Tom Kneitel/TOMCAT,
Editor CB Radio/S9



WITH Santa and his merry band of reindeer breathing down our necks, many of us will be faced with the prospect of buying a CB rig, either as a gift for ourselves, or for little Elmo who was promised one if he'd stop stealing hubcaps for 2 weeks running, or perhaps for Uncle Horace—the guy who has so much that there seems nothing that he doesn't have, except maybe your name in his will.

But buying a CB rig can take place on several different levels ranging from a quickie trip to the nearest place that sells CB gear and plunking down your greenstamps for the rig that is most prominently displayed on their shelves; right to being a clever and crafty shopper who is armed with some insights on how to master the art of shopping for a rig; it could save you cash and later inconvenience.

So here are some random thoughts on things to keep in mind as you survey the barrage of CB equipment set out for this Christmas season, although you can keep these things in mind at any time of the year—and even when you're shopping for other types of electronics equipment such as stereos, TV's, or whatever.

Price is generally a major factor in considering what to buy, and CB's are constantly made aware of the fact that a rig selling for \$195 in one store can be picked up for \$79.95 in another. The CB marketplace has been the scene of many so-called *discount houses*, however while the lure of CB rigs being sold at *unbelievable* cut prices is certainly a strong one for the average customer, there are several factors involved in how those prices are figured out which are worth knowing—and which could well cause you to pass up one dealer offering a rock bottom price for one offering the identical rig for more dollars.

For instance, some cut rate places do a very large volume of business but they don't have any staff on hand to service the equipment or install it for those customers who don't want to do their own installation. This, naturally, gives them a lower operating expense than other dealers who do offer those customer service. One full-service CB specialty shop owner told me that there were discount stores in his area that were doing such a huge volume of business that they were able to *sell* the rigs for less than he could *buy* them!

Another factor sometimes encountered in rock-bottom discount stores is the little-known practice of offering *repacks*. A repack is a rig which was sent back to the factory for some sort of defect which was repaired, then the set was placed in a new packing carton and again offered for sale. While

the repaired defect may have been as minor as a very obvious loose solder joint, it could also have been as extensive as a series of multiple defects, some which may have been overlooked in the repair process—thus producing the rare but nevertheless classic *lemon* which seems to defy all attempts at repair. But if you buy a repack you take your chances, and it seems that there is no way a customer can easily tell if the set he's buying is a repack—dealers can sell them as *new*. However, since the primary method of selling repacks is at outrageously low prices through super cut-rate discount stores, it's something to keep in mind when you shop.

Lower-than-usual prices are also offered at legitimate sales run by normally higher-priced CB suppliers, and at electronics chain stores. Electronics chain stores offer the additional advantage of being sympathetic to your problems, regardless of which branch store you happen to be near at the time the problem strikes.

Even higher priced stores will sometimes offer their customers off-brands, and these can be touch and go should you later have a problem with the gear. While parts can sometimes be a problem, the most often encountered complaints include the fact that they are not of the highest quality in the first place and that, when a repair is needed, nobody can locate a schematic of the set to even try to repair it.

So, in addition to pricing, determine exactly what kind of guarantee or warranty is being offered. Can the seller repair the rig right in his shop, or will he simply pack it up and mail it off to the factory? Or do you get a *lot-line* guarantee—that means, when you take the set across the marker line at the end of the dealer's parking lot your guarantee expires!

The idea is to shop around.

WHAT DO YOU NEED?

Getting the set you *need* requires some thought in order to get you a *best buy*. If you're mainly interested in hearing traffic reports and news of Smokey, you can probably get it all together with a 23-channel rig; fact is that you'd be able to do your thing with a rig that offered only 5 or 6 channels! After December 31st this year it won't be legal for dealers to sell new 23-channel rigs, and some stores may be sufficiently overstocked with them as the deadline date draws near in order to close out any remaining ones before they have to eat them as appetizers along with their New Year's Eve champagne!

(I would add here that any 23-channel sets which are still unsold by

late December should be carefully evaluated as to why they weren't bought after all this time. Are they bottom-of-the line or off-brand cheapies, or are they perhaps overpriced behemoths that nobody wanted? That's worth keeping in back of your noggin.)

But if you want to *fully* explore the *many* facets of the wide and wonderful world of CB radio you'll want to get a 40-channel rig, and most likely you'll also want to consider getting a rig with the *plus* of being operable on single sideband, since most of the operation you'll encounter on 5 or more of the channels at the high end of the band will be using SSB. And even if you're only interested in AM operation only *at this time* you might still plan ahead to the day when you will decide to go sideband; if you have a rig with sideband capabilities already under your dashboard you won't have to get another set! And there's plenty of good AM activity on Channels 24 through 31 which you won't get on a 23-channel set!

Another advantage of 40-channel sets is that they are built to meet much tighter anti-TVI standards than were the 23 channel rigs—and most people have found that, in general, their performance is better than their 23-channel *fathers*. Early rumors to the effect that 40-channel rigs didn't perform as well as the older 23's were unfounded; they are required by federal regulation to put out the same power!

You may also want to decide if you'll be using your set exclusively in your car, or will be requiring its use as a base station. Most sets designed as base stations are too bulky to double as mobile units, and sets designed for mobile operation usually require the operator to purchase a special power supply for home use.

As a rule-of-thumb, once you decide the general requirements you have for a CB rig, it's best to get the very best unit in that category that you can afford. There's nothing quite as irritating as skimping on the purchase of something (car, home, stereo, or whatever—including a CB rig) only to find out after you start using it that you should have perhaps not been quite as frugal and had spent 10% or even 20% more than you paid to get something that would have made the difference between a purchase which is *tolerably suitable* and one which is *just what you really wanted!*

MAKE SURE IT WORKS

Whatever you buy, ask the salesperson to open the carton and let you see the set you have paid for before you walk out of his store. You know how it is, with *your* luck the carton

high performance CB antennas

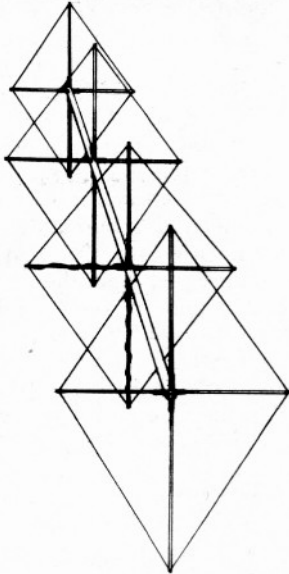
SE SIGNAL ENGINEERING

STEP UP

Your Base Station Capability with

—WHITE LIGHTNING—

FOUR ELEMENT QUAD
BASE STATION ANTENNA



OUTSTANDING FEATURES

- Nearly 30X power multiplication off the front.
- Over 4000X rejection of unwanted signals off the sides and back.
- Factory pre-tuned for all 40 channels — no user matching adjustments required.
- Lightweight (20lbs.).
- Dual polarization, selectable from the operating position.
- Survives high winds, and presents a clean crisp appearance with low wind profile.

Retails for \$144.95

SUPERHAWK
TWO-ELEMENT QUAD
BASE STATION ANTENNA

Our two-element full-size Quad for Base Station use provides really outstanding performance.

Over 10X power multiplication off the front. Nearly 2000X rejection of unwanted signals off the back.

Lightweight (8lbs.).

Dual polarization selectable from operators position.

For further information and full specs, write or call,

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Aptos, Calif. 95003

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Dealer/Distributor Inquiries Invited

... the dealer who doesn't really give a hoot about ...
you ... figures to be selling discount vacuum cleaners or
door-to-door pots and pans ... after the holiday season ...!

will contain the *one* set that was in the way of the rampaging elephant that got loose from the zoo located down the street from the CB factory! So, take a look at the rig, make certain that everything is in the box that is supposed to be there—mike, maybe a mobile mount, mounting hardware, instructional literature, etc. If it's not all there, ask for another set. Once you've checked it out for its contents, don't be afraid to ask to see the rig in operation, preferably on a meter which will demonstrate for you that it is putting out about 4 watts of power and does between 85 and 100%. Listen to the set's receiver working—just to make sure that it does!

Any CB shop which refuses to permit you to check out a set which you have already purchased should be prepared to offer you a reason why, a *damned good reason*. Any CB shop which refuses to give you a different set off the shelf to replace one which does not pass your eyeball and bench test should be regarded with *extreme* suspicion. Luckily, most worthwhile CB dealers are only too happy to let you get a look inside the box you bought—they want you to become a regular customer. You might then wonder about the dealer who doesn't really give a hoot about whether or not you become a future customer—maybe he figures to be selling discount vacuum cleaners or door-to-door pots and pans right after the current holiday season ends! He would be a poor candidate for you to select as your CB supplier.

OTHER STUFF

Like antennas—many CB'ers spend too much time nit-picking over which rig they will buy and a surprisingly little amount of thought on the antenna they are buying to use with it. Fact is that many dealers will tell you that the antenna is half the battle—some dealers will go so far as saying that the antenna is *most* of the battle of zooming a CB signal from *here* to *there*. The difference a decent antenna makes is *so* dramatic that even

a so-so CB rig will work well if tied into a good antenna, as opposed to the fact that even the best super-deluxe CB rig will probably offer poor performance if it is connected to a poor antenna, or not matched properly to a good antenna.

This brings up an interesting point. Many CB'ers will happily offer you opinions on this or that CB rig and whether or not you should buy one. By all means, ask for such opinions and listen to what they have to say—however if you get a depressingly bad report on a particular set, take it with a grain of salt until you hear reports on the same rig from several other people. Ask yourself if the fellow with the doomsday report may have simply installed the set with a poor antenna, or a poorly matched antenna system. Or, maybe he had a set which required servicing.

When making your purchase, you may also want to investigate the possibilities of accessories such as a mobile slide mount, power mike.

Remember, *you* are the customer. If you don't like the deal, the salesperson, the store and their sales policies, you have every right in the world to put your checkbook or credit card back into your pocket to check out other suppliers.

In general, do your CB shopping in electronics chain stores and CB specialty shops rather than in stores which happen to also sell CB in addition to their main product line of auto supplies, or cameras, or whatever. And electronics chain and CB specialty shops are also much preferred to general department stores—would you want to ask an opinion of a CB rig from a clerk who yesterday was selling ladies' handbags and tomorrow will be selling wallpaper?

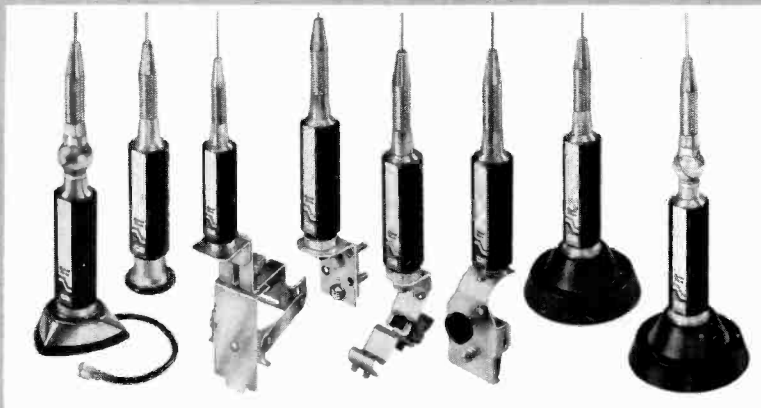
Stick with the specialists, they will help you to understand your specific needs and can offer you valid opinions on current equipment.

Shop around, understand what you need, know what you're looking for, ask questions, see what you're buying—and save greenstamps!

Channel Master gives CB a new twist!

When it comes to innovation and convenience, Channel Master comes on strong...with the new Power Master CB Antennas. Only Power Masters offer a unique Quick Lock Bayonet Mount feature which enables the antennas to be installed or removed with just the twist of a wrist! It's a convenient, theft-proof feature...one you'll really appreciate when parking or driving through a car wash!

Power Masters are full size, high-performance, base load CB antennas. They're completely weatherprotected and use a positive-bevel lip design to eliminate moisture detuning. All base load coils have been epoxy dipped to further insure moisture protection and SWR stabilization.



Power Master Mobile CB Antennas...a model for every need.

Power Masters deliver excellent CB Performance across all 40 channels with an average SWR of only 1.3:1. They come with a high-capacitance, stainless steel whip and stainless steel shock spring.

All deliver great CB performance and are supported by Channel Master's quarter century of electronic engineering experience.

Channel Master

Division of Avnet, Inc.
S91277, Ellenville, N.Y. 12428



Twist, it's on... Twist it's off!



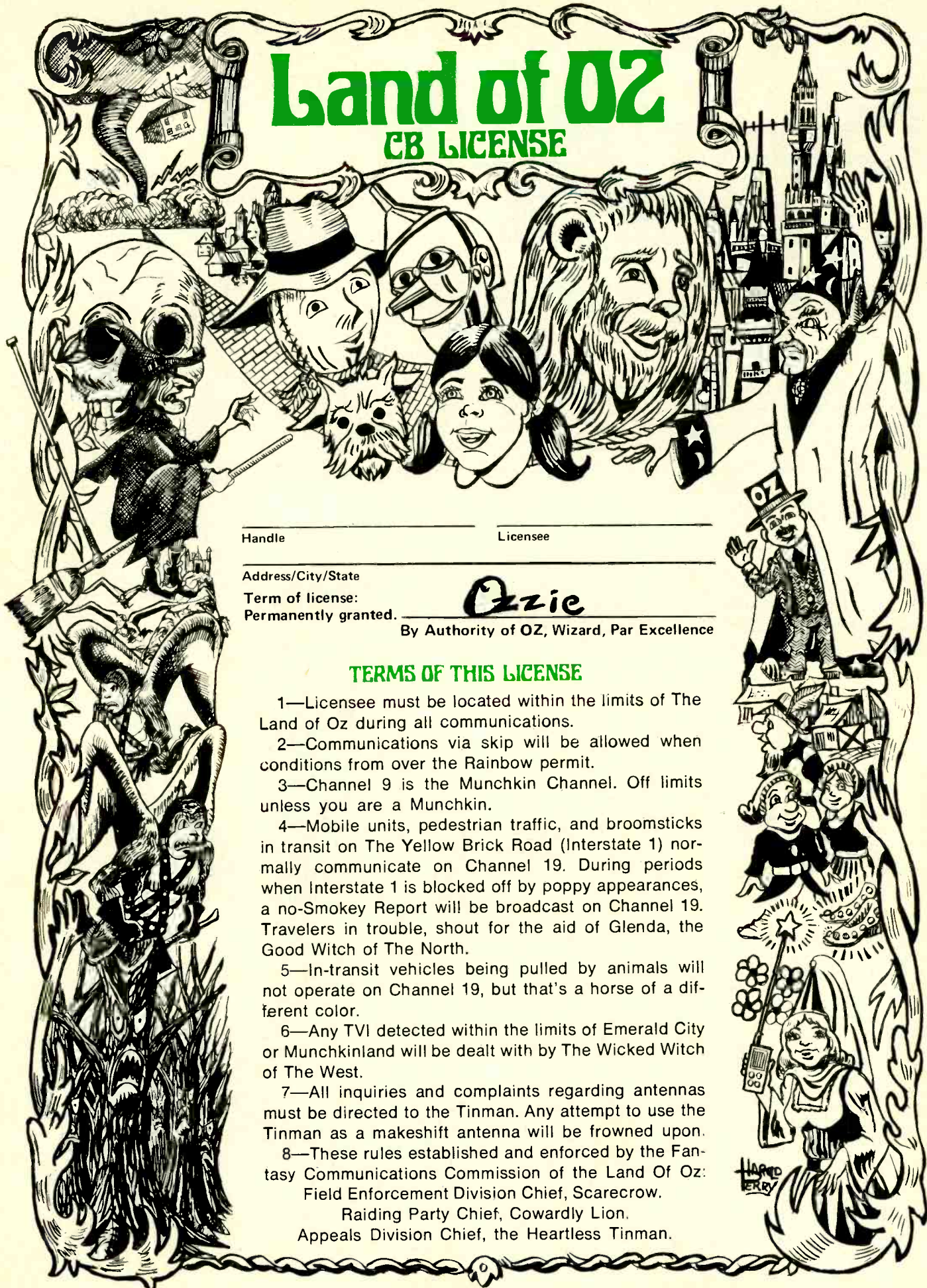
Padded internal support assures stability.



*Model 5061
Trunk lip mount
\$28.95 sugg. list*

Land of Oz

CB LICENSE



Handle _____

Licensee _____

Address/City/State _____

Term of license: _____

Permanently granted. _____

Ozzie

By Authority of OZ, Wizard, Par Excellence

TERMS OF THIS LICENSE

- 1—Licensee must be located within the limits of The Land of Oz during all communications.
- 2—Communications via skip will be allowed when conditions from over the Rainbow permit.
- 3—Channel 9 is the Munchkin Channel. Off limits unless you are a Munchkin.
- 4—Mobile units, pedestrian traffic, and broomsticks in transit on The Yellow Brick Road (Interstate 1) normally communicate on Channel 19. During periods when Interstate 1 is blocked off by poppy appearances, a no-Smokey Report will be broadcast on Channel 19. Travelers in trouble, shout for the aid of Glenda, the Good Witch of The North.
- 5—In-transit vehicles being pulled by animals will not operate on Channel 19, but that's a horse of a different color.
- 6—Any TVI detected within the limits of Emerald City or Munchkinland will be dealt with by The Wicked Witch of The West.
- 7—All inquiries and complaints regarding antennas must be directed to the Tinman. Any attempt to use the Tinman as a makeshift antenna will be frowned upon.
- 8—These rules established and enforced by the Fantasy Communications Commission of the Land Of Oz: Field Enforcement Division Chief, Scarecrow. Raiding Party Chief, Cowardly Lion. Appeals Division Chief, the Heartless Tinman.

Announcing our new line of hearing aids.

When it comes to microphones and antennas hearing is believing. And we're coming across loud and clear.

We've got a complete line of microphones and antennas designed to compete with anybody in the CB industry.

But what did you expect from a company with a name in electronics like GTE Sylvania?

Our supersensitive antennas are made from high quality materials. They come in a wide variety of mounts from magnetic to roof/trunk.

Our microphones have a Match-All™ adapter. You don't need special tools, soldering irons, or a degree in electronics to hook them up.

So stop in to your CB dealer and tell him you'd like to upgrade your present system with a Sylvania system. Or ask other CBers about Sylvania microphones and antennas.

You won't believe your ears.



BRRAIN

CLEAR YOUR NOGGIN FOR THE HOLIDAYS!

WE don't normally run puzzles, but we felt that holiday time requires some sort of special observance—so we've picked a few brain busters which our readers have sent in over the past few months. Basically, they taunted the CB RADIO/S9 office staff with the challenge of trying to solve them. We were actually able to figure all of them out after some deliberation, although several were somewhat on the hairy side.

If you can come up with the answers, you're on the ball. You can check out the answers that you came up with against those shown in this issue on page 96, but *no cheating!*

RESCUE PATROL BOATS

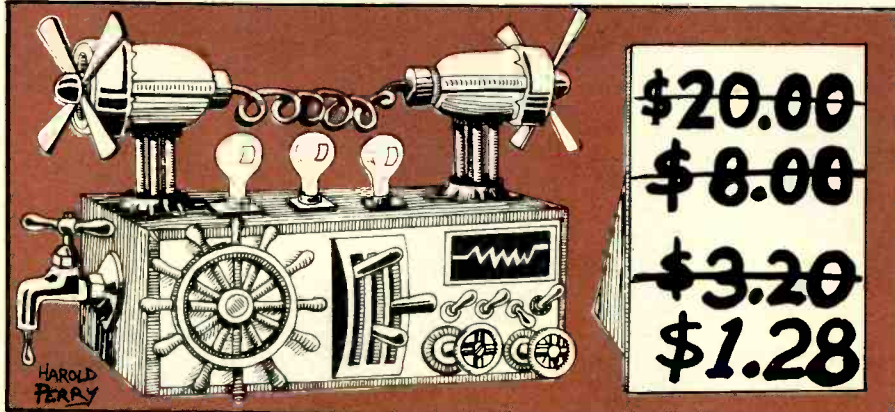
The Acme CB Marine Rescue Service and the Zonk CB Marine Rescue Service were headquartered on opposite sides of a river. In a combined drill, two rescue boats started from opposite sides of the river at the same instant. One boat, however, was faster than the other, so they met at a point just 720 yards from the shore. Each boat remained 10 minutes at the other team's headquarters and then started on its return trip, when they happened

again to pass one another just 400 yards from the other shore. From the data given, you are asked to show a simple way of determining the exact width of the river. By a kindergarten process it can be explained in a few minutes, and yet 99% of the shrewd folks who have tried it are stumped. Which only goes to show that learning math by sets of rules isn't any where near as useful as computing by common sense.

A STRANGE DISCOUNT

Wierd Willie's CB Discount and Cut-Rate Moped Supply Emporium ran a special clearance on a gadget that was called the *Super Left Hand Polarized Whirling SWR Cutter*—even so, nobody wanted it. So Willie kept cutting the price each week in the hope that *some* CB'er would buy the thing. Starting

out at the original price of \$20 he reduced it each week—as you can see in the illustration. But there is a method to his weirdness, since in one more week's mark-down he will be offering it at his own cost. See if you can figure out next week's price—which is his cost.



BUSTERS



BIG BUSINESS

The local CB club decided to sell a local CB business directory and 5 members of the club pooled their issues to lay in a good stock of the directories, which they sold very actively and then figured up their accounts as follows: Tom Smith sold one directory more than one quarter of the whole lot, while Billy Jones sold one directory more than a quarter of the remainder. Ned Hawkins sold one directory more than a quarter of what was left, and Chuck Anderson disposed of just one directory more than a quarter of the remainder. At this stage of the game, Tom and Ned were just 100 directories ahead, but Jimmy Wilson sold all that were left, so in this friendly encounter Billy and Chuck won out by how many directories do you think?

HOW CHEAP CAN YA GET?

I won't say that PENNY PINCHER, a CB'er I know from Nebraska, is stingy, but I bought an antique CB rig from the guy and he had to weigh it to figure out the shipping costs. What he did was to go down to the corner drug store and, trying to get as much for his nickel as possible, got on the scale while he was holding the package—also, his dog got on the scale too. When he got off the scales he knew that he, the dog and the box together weighed 170 lbs. but he soon realized that he still didn't know how much the package alone weighed. He did know that he weighed 100 lbs. more than the combined weight of the dog and the CB rig, and that the pooch weighs 60% less than the CB rig. He then knew how much the rig weighed—do you know?

PURCHASING POWER

A CB'er whose handle is BARGAIN HUNTER bought 20 CB components for a total of \$20 at a recent CB coffee break. IF transformers cost \$4 each, while switches were 4 for a dollar, and knobs were 2 for a dollar. How did he invest his money?

Answers on page 96!

NO Peeking!

ON THE COUNTERS

S9'S MONTHLY PRODUCT REVIEW

COUNT YOURSELF LUCKY

Redco has announced a full complement of fine frequency counters ranging from basic units to ones which are designed to meet the wants of the most fussy and exacting operator. The Model FM-30 is a low-cost approach to a high-quality, accurate monitor system, suited for CB and/or Ham use. Having the capability of handling as much as a full kilowatt, it reads out transmitter frequencies between 1 MHz and 40 MHz via bright red LED's. A resolution switch brings the accuracy to 100 Hz. All this for *less* than \$100!



Details can be obtained from Redco, 11823 Slauson, Santa Fe Springs CA 90670, or mark number L01 on Reader Service Card.

MESSENGER 92/40 CB

Johnson American, Inc., the personal communications subsidiary of the E.F. Johnson Company has announced the availability of the Messenger 92/40, a professional quality 5-channel hand-held CB transceiver, type accepted by the FCC for 40-channel service. The Messenger 92/40 is similar to the 23-channel Messenger 92 radio; however, the 92/40 has been completely redesigned to comply with the FCC's specifications for 40-channel service equipment. The new model features low power consumption and superior receiver sensitivity and transmit range. Its cast aluminum alloy frame provides exceptional sturdiness.

Johnson's Messenger 92/40 has a nickel-cadmium battery pack that stores enough power for a full day of normal use. Additionally, the charger unit, which



is supplied with the radio, permits full re-charging overnight.

The Messenger 92/40 comes with a LED battery indicator that tells at a glance when charging is required. It is also equipped with a flexible antenna that gives years of trouble-free service in the field.

Like all Johnson CB radios, the Messenger 92/40 is backed by a full one year parts and labor warranty and the Company's country-wide network of more than 1,000 Authorized Service Centers. Mark number L02 on Reader Service Card.

IN-DASH CB WITH AM/FM/MPX RADIO, 8-TRACK TAPE PLAYER

One of the latest additions to Medallion car sound products is the Model 63-540 in-dash 40-channel CB with AM/FM/MPX radio and 8-track tape player.

This all-in-one Medallion product features a full-power 40-channel CB with L.E.D. channel indicator, TX/RX light and adjustable squelch.

The high performance AM/FM/MPX radio has push-button tuning, local/distant switch and stereo system with 4 watts RMS per channel. The illuminated radio dial swings up for 8-track tapes. A CB monitor switch allows the listener to receive CB calls while enjoying favorite AM or FM stations.

Medallion's Model 63-540 comes complete with custom trim plate and both Ford and GM type knobs.



Suggested retail price is \$399.95. Mark number L03 on Reader Service Card.

(continued)



You can turn the CB boom into income...with NRI's complete communications course.

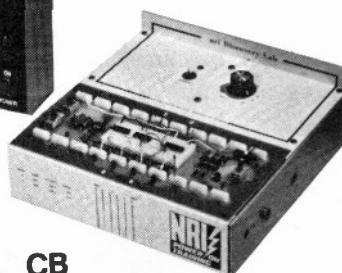
NRI can train you at home for a part-time job or a full time career in communications.

The field of communications is bursting out all over. Millions of CB sets are in operation with millions more being sold annually. That means countless careers in design, installation and maintenance. Start training at home now, the NRI way, to get your all-important First Class FCC Radiotelephone License and qualify for one of these openings.



covers AM and FM Transmission Systems; Radar Principles; Marine, Aircraft, and Digital Electronics; and Mobile Communications. You must earn your First Class Radiotelephone FCC License or you get your money back.
"McGraw Hill CEC

Also included are 8 reference texts and 14 coaching units to make it easy to get your Commercial Radio-telephone FCC License—enabling you to test, install and service communications equipment.



CB Specialist's Course also available.

NRI now offers a special 37-lesson course in CB Servicing. You get your own 40-channel CB Transceiver, AC power supply, and multimeter for hands-on training.

Over a million have enrolled with NRI.

Send for the free NRI catalog and discover why more than a million people like yourself have chosen the NRI way as the right way to get ahead. You learn at home with bite-size lessons, progressing at your own speed to your FCC License and then into the communications field of your choice. There's no obligation and no salesman will call.

If coupon is missing, write: NRI Schools, 3939 Wisconsin Avenue, Washington, D.C. 20016

Learn on your own 400-channel, digitally-synthesized VHF Transceiver.

The 48-lesson NRI Complete Communications Course teaches you to service and adjust all types of two-way radio equipment (including CB), using the one unit that is best equipped to train you for CB, Commercial, and Amateur Communications: a "designed-for-learning" 400-channel, two meter VHF transceiver and AC power supply. Then we help you get your FCC Amateur license, with special instructions so you can go on the air. The unit can be mounted in your car, or you can use it as a base station.

The complete program includes 48 lessons, 9 special reference texts, and 10 training kits. Also included are: your own electronics Discovery Lab™, a new Antenna Applications Lab, an Optical Transmission System, CMOS Digital Frequency Counter, and TVOM. The course

RUSH for FREE Catalog



NRI SCHOOLS
McGraw-Hill Continuing
Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016



Please check for one free catalog only. No salesman will call.

- Complete Communications Electronics with CB • FCC Licenses • Aircraft, Mobile, Marine Electronics
- CB Specialists Course

38-127

- Amateur Radio • Basic and Advanced
- Digital Computer Electronics • Electronic Technology • Basic Electronics
- TV/Audio Servicing • Choose from 5 courses
- Electrical Appliance Servicing
- Automotive Mechanics • Master Automotive Technician and Basic Course
- Auto Air Conditioning
- Air Conditioning, Refrigeration, and Heating • Basic and Master Courses.

Approved under GI Bill if taken for career purposes. Check box for details.

Name _____ Age _____
(Please Print)

Street _____

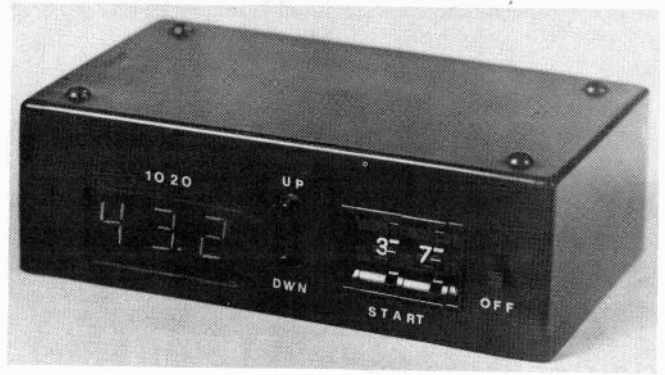
City/State/Zip _____

A National Home Study Council Accredited School

THE 1020 INDICATOR

Finding yourself between milemarks can be most inconvenient when you're asked for your 10-20 on the superslabs. This new device will pinpoint your exact location to an accuracy of 1/10th of a mile! The *1020 Indicator* can count *up* or *down* in mileage, and it is easily connected (no special mechanical knowledge) to any vehicle's distributor when the car is in high gear. Installation takes about 10 minutes or less. The unit itself is mounted within view of the driver and reads out in large LED numbers.

For more information on the 1020 Indicator, contact C.W. Inc., P.O. Box 117, Canal Winchester, Ohio 43110.



Mark number L04 on Reader Service Card.

CONCEALABLE RADIO

RCA has introduced a new 40-channel radio which can be concealed within a car or truck to reduce the chance of theft.

RCA's model 14T275 remote transceiver consists of three parts: a concealable main chassis, a detachable microphone and a microphone mounting bracket.

The main chassis features 100 per cent solid state and phase-lock loop circuitry as well as its own separate speaker and an external speaker jack. The chassis may be hidden under the seat, on the fire wall, in some glove compartments or in the trunk using an optional 13-foot extension cable.

The detachable, hand-held microphone of the 14T275 has all operating controls built into it including on/off, volume, squelch, and channel selector. It also contains a digital channel readout, separate microphone element and separate speaker. When the "Up" or "Down" selector buttons are pressed on the microphone, channels are changed to the next higher or lower numbered channel.

The mounting bracket holds the microphone when not in use and serves as the connection between the main chassis and the microphone. Because of its swivel design, the bracket can be installed under the dash in any position. It contains a switch that permits the use



of either the microphone speaker or the main chassis or external speaker.

Suggested retail price of the RCA 14T275 is \$199.95. Mark number L05 on Reader Service Card.



DYNAMIC ELEMENT COMMUNICATIONS MICROPHONES

Shure Brothers Inc., Evanston, Illinois, has announced two new communications microphones, equipped with dynamic elements, that set new standards for ruggedness, reliability, and transmission quality in safety, transportation, and industrial communications applications.

One of the new microphones is the Model 524C Ranger 2, a transistorized unit, which is designed to match carbon microphone-type circuits and significantly improve intelligibility and consistency of performance.

In addition to the new omnidirectional dynamic cartridge that offers a wide frequency response, the new Model 524C also features a built-in transistorized amplifier to supply sufficient output signals to permit the use of up to 30m (100 feet) of unshielded cable.

The other new microphone is the Model 577 Sonobar. It combines a noise-canceling pickup pattern and a "tailored" voice-range frequency response to block out unwanted noise and boost close-up voice signals. The Sonobar is ideal for all fixed-station and mobile applications where high ambient noise conditions are a problem, such as in factories, restaurants, garages, and safety and transportation applications.

The new Shure Model 577 Sonobar microphone is

available in three versions: a high impedance model, a low impedance model, and a transistorized model for carbon-microphone-type circuits. The new 577 series replaces the now-discontinued Shure 488 series, with the exception of the FAA-approved 488T which is still available.

User net prices of these new microphones are: Model 524C Ranger 2, \$66; the 577A (high impedance), \$76.75; the 577B (low impedance), \$76.75; and the transistorized 577C replacement for carbon microphones, \$84.75.

For additional information, write: Shure Brothers Inc., 222 Hartley Avenue, Evanston, Illinois 60204, or mark L06 on Reader Service Card.

CORVETTE T-TOP CB MOUNT

Now, owners of Corvette autos with the distinctive "T-Top" can easily mount CB antennas on their cars, thanks to Antenna Incorporated's new Model 18312 mounting bracket.

According to Randall J. Friedberg, Sales Manager, mounting CB antennas on Corvettes poses two problems. First, because the Corvette's body is made of fiberglass, it is difficult to form a good ground plane for a CB antenna. Second, most Corvette owners do not want to install anything on the car which might damage the body or its finish.

Studying both problems, Antenna Incorporated discovered that the Corvette's integral roll bar and the metal in the windshield frame provide enough metal for an adequate ground plane. The company then developed a bracket which would mount without disturbing the T-Top, and the result was the Model 18312.

The polished stainless steel mount will not rust, and will not detract from the aesthetics of the automobile. It can be used with any base or center-loaded CB antenna. Suggested resale price is \$5.95.

For further information on the Model 18312 Corvette

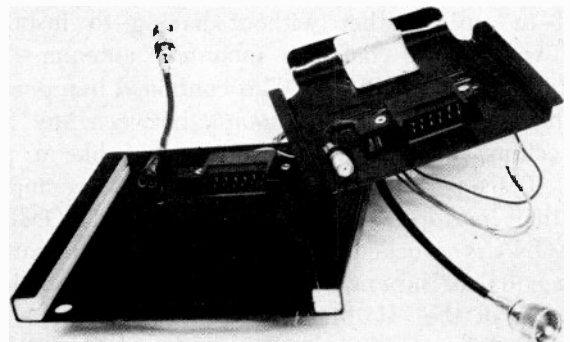


T-Top mount and the complete line of Antenna Incorporated antennas and accessories, contact Antenna Incorporated, 23850 Commerce Park Road, Cleveland, Ohio 44122, or mark L07 on Reader Service Card.

THREE NEW SLIDE MOUNTS

Southcom, Inc. announces the introduction of three new slide mounts for mobile tape decks and two-way radios. Slide mounts allow the user to remove his unit when he leaves his car, trunk, or boat, to avoid theft. They also allow easy change from one vehicle to another.

All three Southcom mounts are heavy 20-gauge steel, finished in a black scratch-proof epoxy finish. All use polyethylene slide guides for ultra-smooth operation, and a stainless steel latch to insure reliability of all connections. *(continued)*



The MB-1 is the mount only, with no plugs or wiring, and will list at \$7.25. The MB-2 is for tape players, and provides automatic 6-wire connection for power and speakers through computer-type plugs, connecting automatically when the radio is slid into operating position. List price is \$14.95 on the MB-2.

The most exciting of all is the MB-3, specifically designed for two-way radio use. In addition to the 6-wire connectors, it includes an internal coaxial connector which automatically makes positive antenna connection. This new miniature UHF connector was designed for use in the UHF frequency range, and

Southcom guarantees that it will introduce no SWR or loss into the radio system! The connector presents less "insertion loss" than the PL-259 type connectors normally used in most existing two-way mobile systems. The model MB-3 will resell at \$19.95 at dealers throughout the country.

These deluxe heavy-duty slide mounts are approximately six inches square and only 9/16 inch thick. They are designed to withstand the most demanding applications such as large trucks and boats, and heavier radio or tape units. Mark L08 on Reader Service Card.

NEW PUSH-ON PL-259 CONNECTOR

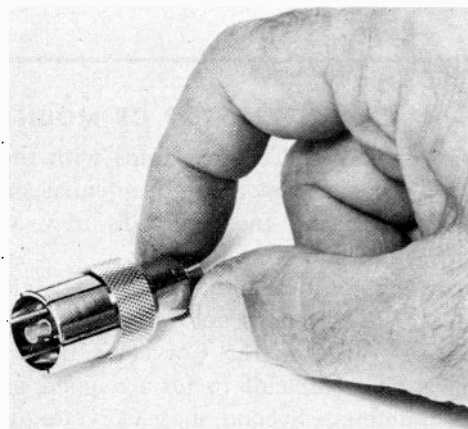
New push-on connectors for adapting RG-58/U antenna cables to PL-259 terminals on CB equipment are now available from BELL INDUSTRIES/J. W. Miller Division.

The connectors permit easy disconnect of antennas from CB equipment on slide out brackets in vehicles, quick-hook-up of test equipment and many other applications.

The nickel plated brass connector includes the adaptor that frequently had to be bought as a separate item.

This new connector has been added to the Miller line of CB filters and accessories, and packaged for convenient shopping on the RAK-300 merchandiser.

For additional information, contact Jerry Hall, Operations Manager, Bell Industries, J. W. Miller Division,



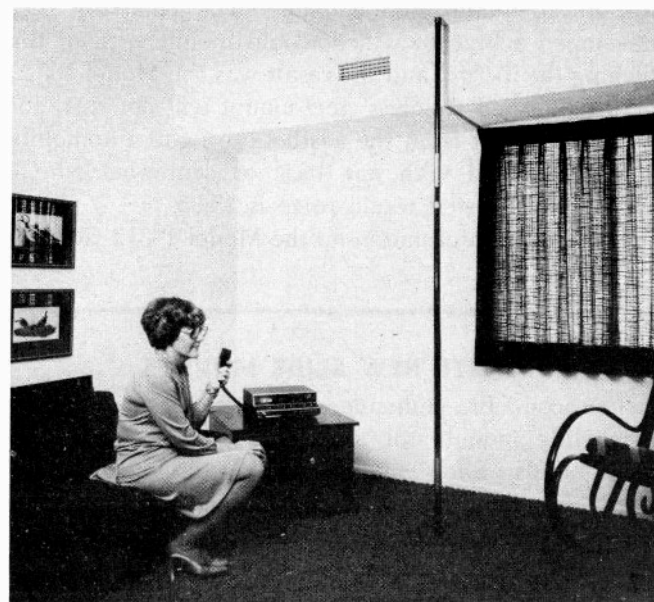
P. O. Box 5825, 19070 Reyes Avenue, Compton, CA 90224, or mark number L09 on Reader Service Card.

INSTANT INDOOR CB BASE STATION ANTENNA

Anyone who can't or won't install a roof mounted CB base station antenna finally has the inside answer from Hustler. A new, instant-setup, indoor antenna that is ready for full 40 channel operation in minutes has been announced by New-Tronics Corporation in Cleveland Ohio, originator of the famous Hustler brand of CB and amateur antennas.

Designated the HP-27 "HOMING PIGEON", this unique innovation in base station CB antennas gives mobile CB'ers the ability to operate a base station anywhere—condominium, house, apartment, office, motel—in any weather without having to install a roof, window or balcony mounted antenna. The Hustler "HOMING PIGEON" is contained in a decorative housing and installs *instantly* between any floor and ceiling—7½ to 9½ feet high—just like a pole lamp. Tests performed by New-Tronics have indicated that performance of the Hustler "HOMING PIGEON" is excellent, providing a communications range equal or superior to better mobile installations.

Tuning of the "HOMING PIGEON" is quickly accomplished by simple adjustment of two free sliding



tuning sleeves. One setting covers all channels and the only tool needed is an SWR bridge. SWR at resonance is adjustable to 1.1:1 or better. For 40 chan-



Rip Off

A REBATE... on the C.B. Antenna that's changing the market!

Rip off this ad and the opportunity to save yourself from \$3 to \$10 on **Vendetta**, the revolutionary CB antenna that's changing the market. During our National "Rip Off **Vendetta**" campaign, you can enjoy a sizable rebate on any **Vendetta** antenna model you purchase.

The fiberglass-constructed **Vendetta** "no-loading coil" design not only achieves the efficiency and performance formerly found only in the standard 102" standing wave antenna, but actually out-performs the 102" under moving conditions. And **Vendetta** is adaptable to virtually any

existing antenna mounting.

The broad-banded **V-Load™ Vendetta** is capable of handling all the 40-channel wattage you've got to give, and operates as efficiently on motorcycles and boats as it does on automobiles and trucks.

If **Vendetta's** unsurpassed performance is what you've been waiting for, this is an opportunity you don't want to miss. Just **Rip Off** this ad today, and present it to your nearest participating dealer. During our "Rip Off **Vendetta**" campaign, he's offering you substantial cash savings on the most revolutionary CB antenna sold.

I'm here to rip off **Vendetta!**

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Type of Vehicle _____

This offer expires December 15, 1977.

Model#	Description	Suggested Retail	Rebate Amt.
VTL-1	Trunk Lip Mt. Antenna	\$29.95	\$ 5.00
VST-1	Single "Western" Mirror Mt. Ant.	\$29.95	\$ 5.00
VHB-1	"Swivel ball" Hatchback/Trunk Lip Mt. Ant.	\$32.50	\$ 7.00
VMG-1	"Magnetta" Magnetic Mt. Ant.	\$34.95	\$ 7.50
VEN-2	Complete "Roof/Fender" Mt. Ant.	\$19.95	\$ 3.50
VEN-3	"Replacement" Ant. w/Base Adapter	\$17.95	\$ 3.00
VTT-1	"Co-Phase"/Dual "Western" Mirror Mt. Ants.	\$49.95	\$10.00

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Vendetta

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Houston, Texas 77057 Phone (713) 780-3990

nel operation, SWR averages well below 2:1. The Hustler "HOMING PIGEON" is a perfect match for 23 or 40 channel CB, AM, or SSB.

The new portable Hustler "HOMING PIGEON", HP-27 is supplied complete with a 17 foot coax cable

ANTENNA FOR TRUCKS AND VANS DEVELOPED

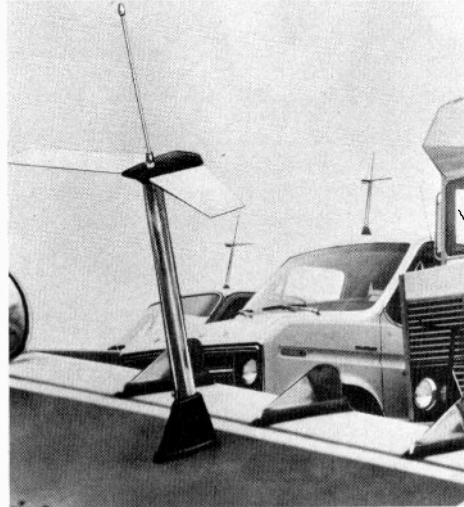
Channel Master has introduced a new version of its popular Power Wing CB Antenna, specially designed for installation on trucks, pickups, vans, and recreational vehicles.

The new Truck/Van Power Wing is a capacitively top-loaded antenna that, mounted on a vehicle's roof, out-performs dual mirror mounted whip antennas. It provides higher current and greater radiating efficiency than inductively loaded CB antennas, and its rigid construction prevents detuning at high speeds. The antenna achieves its superior performance by combining its top-loaded design with a unique grooved-core, high Q coil housed in a weatherproof base.

The Truck/Van Power Wing is only 16" high, and has a short telescoping fine-tuning stub on top. It is made of aircraft strength aluminum and is protected with a tough marine acrylic coating. A durable neoprene gasket further weatherproofs the installation.

and factory installed connectors. The suggested list price for the Hustler HP-27 is \$42.95.

For more information contact: Marketing Department, New-Tronics Corporation, 15800 Commerce Park Drive, Brookpark Ohio 44142, or mark number L10 on Reader Service Card.

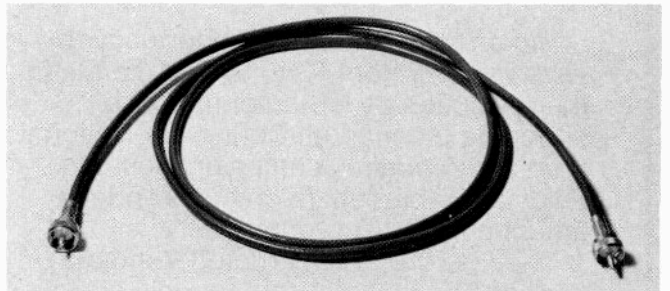


The antenna is easily removed for security reasons. Retail price, \$29.95. Mark number L11 on Reader Service Card.

CB TVI FILTER CABLE

Vitek's CB TVI Filter Cable for CB transceivers eliminates or greatly reduces the 2nd and 3rd harmonic interference to TV channels 2, 5 and 6. This innovative filter cable looks like an ordinary piece of 50 ohm coaxial cable but built inside the cable are multiple distributed resonators to trap 54 MHz and 81 MHz. The filter cable is designed to be connected in line between the CB transceiver and the CB antenna at the CB transceiver antenna terminal.

The CB TVI Filter Cable does not require the use of a jumper cable to connect it to the CB transceiver. The filter cable comes in two lengths; a 6-foot length, designed to be connected into an existing CB system,



and an 18-foot length, designed to entirely replace the RG coaxial cable commonly used in mobile CB. Contact Vitek Electronics, Inc., 200 Wood Avenue, Middlesex, NJ 08846, or mark number L12 on Reader Service Card.

BAFFLED BY MIKE PLUGS?

A rather high percentage of CB'ers have a similar chronic complaint, that being that they seem to have size 12 fingers that are rather unsuited to wiring what seems to be a size 2 mike connector! All is not lost, a company called DR&R electronics has an interesting approach to curing this long-time problem. DR&R has gotten it all together and produced a cassette tape entitled *How To Wire Your Mic to Any CB Radio in 5*

Minutes or Less. The cassette gives the complete scoop, along with simple accompanying diagrams, so even the very worst *klutz* can learn the secrets of defeating the challenge of the devilish microphone connector. Great idea!

For more information, contact DR&R Electronics, 835 North 8th Street, Terre Haute, IN 47807, or mark number L13 on Reader Service Card.

NEW COLOR SCHEME FOR CB ANTENNA PACKAGES

Sylvania CB antennas are now available in new bright yellow and black packages. The antennas are part of the CB products line offered by the Replacement Markets Operation of GTE Sylvania Incorporated, a subsidiary of General Telephone & Electronics Corporation.

The new packaging color scheme features black lettering on a yellow background and was adapted to make the antenna line compatible with Sylvania CB microphone and accessories packaging. The new packages will assist Sylvania distributors in merchandising CB products.

Sylvania CB products include a wide variety of mobile and base station antennas, power microphones with universal "match-all" plug-in adapters, accessories, and solid-state replacement devices for CB equipment. They are available through distributors of Sylvania electronic components. For complete information, contact: GTE Sylvania, Special Products Mar-



keting Dept., 100 First Ave., Waltham, Mass. 02154. Mark number L14 on Reader Service Card.

DO-IT-YOURSELF APARTMENT ANTENNA

Range means more to Antenna Incorporated engineers than CB transmitting distance. It also means "stove," and that, or any other, metal clad kitchen appliance, is the essential component in Antenna Incorporated's do-it-yourself apartment house antenna.

According to Antenna Incorporated, mounting their Model 13510 magnetic mount antenna—the Zapper—on top of a range, refrigerator, dishwasher or other metal clad appliance creates the most efficient and economical indoor Citizens' Band radio antenna available.

The antenna uses the metal in the appliance to form the ground plane.

The antenna system is claimed to work well on furnaces or stationary tubs with metal rims in single family homes. If no metal clad appliances are conveniently located, a four square-foot piece of window screen will form an adequate ground plane for the Model 13510 mount antenna to work indoors.

There is only one circumstance which will prevent this antenna (and all other indoor antennas) from working properly. This is where the insulation between the inside and outside walls uses aluminum foil. This metal between the walls will effectively block



most antenna radiation, regardless of the antenna used. Mark number L15 on Reader Service Card.

CB LINE FEATURES 26 MODELS

Clarion's line includes 26 different 40-channel CB systems, 8 CB antennas, and 13 speaker systems including a specially designed CB extension speaker.

The Clarion CB line is built around the company's modular "Mike System" which uses the speakers of any auto sound system. It consists of a stylish "Mike"

containing full operating controls as well as a large, easy to read digital channel indicator. The system includes a sophisticated remote transceiver and a discretely sized microphone connector.

Because the "Mike System" is designed to work with auto sound systems, Clarion is packaging it with its

22 in-dash radio and combination radio/tape units. The "Mike System" is also available as a separate system for use with existing auto sound systems.

Clarion's '77 line also includes three new in-dash 40-channel units with digital channel indicators built in the faceplate. All operating controls for the CB are on the microphone, which is identical to the hand-

some unit featured in the "Mike System" except for the built in channel indicator.

The new RCJ-367 in dash unit features AM/FM/MPLX in addition to 40-channel CB. The RCJ-621 adds an 8-track player while the RCJ-672 adds a stereo cassette player. Mark number L16 on Reader Service Card.

COVER ALL 40 CHANNELS

A trunk mount antenna spanning the newly authorized CB channels has been announced by Antler Antennas of Fort Worth, Texas. The new precision tuned Antler model delivers amazingly flat readings over the entire 40 channels authorized by the F.C.C.

The extremely shallow SWR curve of the new Antler represents a technological achievement in antenna efficiency . . . delivering a signal that pierces through the clutter found on today's CB frequencies. While each mobile antenna installation presents variations due to the ground plane of the auto body, the manufacturer claims that tests have proved the Antler out performs other antennas in most installations.

While all models in the current Antler line will provide coverage of the expanded CB channels, the shallow SWR curve of the new antenna should provide a higher level of performance for both current 23 channel units and the broader 40 channel models.

The new Antler is a trunk mounted, center load design. It is manufactured in the U.S.A. to rigid quality standards. Each coil is individually tuned and sealed against moisture to assure the highest performance levels. Fittings are chrome plated brass. Whips are manufactured of 17-7 PH heat-treated



stainless steel for added flexural strength and resiliency.

Antler antennas are sold nationwide through authorized distributors and dealers. For more information, write Antler Antennas, MCM Mfg. Co., 6200 South Freeway, Fort Worth, Texas 76134, or mark number L17 on Reader Service Card.

NEW DESIGN IN FIBER GLASS ANTENNA

CB'ers have a new technology available in an auto antenna designed with its wires, or solid state "load," built directly into a fiberglass rod for improved transmission and reception.

The Vendetta antenna will transmit on or receive more than 40 channels claims the Dallas-based Vendetta Corporation.

Referred to as V-load, the design differs from most conventional CB antennas in which wires are wrapped in a tight coil around a center rod. In the V-load, wires are embedded in a rod made of PPG Industries fiber glass and run straight up and down the length of the antenna rather than in the traditional coil shape.

Both systems shorten the length of what would otherwise be a 108-inch-long whip antenna, but the

V-load design also eliminates the resistance of conventional coil-wrapped antennas and allows maximum current flow. As a result, more transmitter power reaches the antenna, so more power is radiated.

The antenna is constructed of a heavy fiber glass rod, $\frac{3}{8}$ inches in diameter, so it will not bend in the wind.

A full-length whip antenna has a traveling disadvantage because it sways back and forth in the wind causing signal fade and power loss, the company claims. They say that they have tested the Vendetta antenna at 90 miles an hour and it stays vertical. The fiber glass keeps it from swaying.

Vendetta antennas are portable and can be quickly mounted on trunk or hood without drilling holes.

Mark number L18 on Reader Service Card.



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ON THE SIDE

S9'S MONTHLY COLUMN FOR SIDEBANDERS
BY BILL SANDERS/SSB-295, KW-5304

FIXEM-UP DEPT. SIDEBAND ID NUMBERS

Single Sideband operators don't use AM type handles or unit numbers for identification purposes. Instead they use special Sideband ID numbers. Those many readers who have written to us asking about how they may obtain a set of these numbers are advised that we recommend joining the SSB Network, which is the nation's oldest and largest group of Sidebanders. A self-addressed stamped envelope sent to the Sidebanders' Service Bureau, P.O. Box 381-R, Smithtown, N.Y. 11787, will bring you information telling how you can become a part of this vast network. Their national "SSB" ID numbers can be obtained without cost or fee. We suggest that all Sidebanders avail themselves of this opportunity to join this network—even if you are a future Sidebander, or an old-timer who already has "local" numbers.



SIDEBANDER V

SBE, Inc. has introduced a new single sideband/AM Mobile transceiver, the Sidebander V.

According to SBE president, the Sidebander V is a compact, highly sophisticated 40-channel SSB/AM Mobile transceiver featuring digital PLL circuitry for accurate frequency generation of upper and lower sidebands, as well as the 40 AM channels. The Sidebander V has distinctive features such as a channel 9 instant access switch for transfer to that emergency channel, and a channel scanning switch that scans all 40 channels and locks on the first clear channel found. It also features the exclusive SBE "Speech-Spander," automatic modulation level control, a rapid-turn channel selector and large, bright LED

channel readout. Other features include an SSB clarifier and switchable noise blanker and noise limiter, PA provision.

The Sidebander V has a power output of 4 watts AM and 12 watts SSB PEP.

Further information is also available by writing SBE, Inc., Dept. S9, 220 Airport Blvd., Watsonville, Calif. 95076.

SIDEBAND FREQUENCIES— OUR READERS VOTE!

In our January (1977) issue I spoke of the possibilities of Sidebanding in a CB service which had just been granted 17 new channels. I told my readers that, while Sidebanders should continue using their former frequency or frequencies (such as 16-L or other ones in the Channel 1 through 23 spectrum), that we should *also* start staking out some of the newly opened frequencies above Channel 23.

I had, last January, told you that the most workable plan seemed to me the TAKE FIVE idea proposed by the SSB NETWORK; this called for Sidebanders making heavy use of the 5 high-end frequencies, Channels 36 through 40 (or .365 through .405, if you prefer those designations). This idea had merit for a number of reasons; including the fact that many Sidebanders already had equipment which was operable on these frequencies; the fact that it would be easier to expand to additional channels (one at a time) perhaps should the need arise since this is the dead-end of the band and we would only have to worry about expanding in one direction instead of two—that means that it would also be easier to *defend* Sidebanding frequencies from AM erosion since the invaders could only come in from one direction. It was a nice, solid, little block of frequencies which we could set aside and call our own.

Mail has been coming in on a regular basis ever since then; and while it always ran higher towards support of TAKE FIVE, I would have to say that the most highly emotional letters came in from some Sidebanders who felt that TAKE FIVE didn't go far enough, claiming that we should insist that Sidebanders stakeout claims on .315

or .325 and all other frequencies right up to .405.

Of course, TAKE FIVE did not say that additional frequencies should *not* be used, all it stated was that (regardless of any other channels which might be put into use by Sidebanders) the top 5 should be given a heavy concentration of use in order to establish the fact that they were, indeed, used exclusively for Sidebanding. But some readers were demanding that 5 frequencies from the 17 new ones just wasn't enough to meet the needs of Sidebanders and that we should change TAKE FIVE to maybe TAKE EIGHT or TAKE NINE.

The most often encountered regional efforts to obtain more than five of the "new" frequencies for Sidebanders seemed to come from the Pacific northwest; nationally, the major efforts to occupy additional frequency space came from current and former "HF" operators who had been using .315 or .325 through .405 for several years before the FCC gave these frequencies the green light.

Other voices were heard too—a fellow wrote to me from southern California, said he was the President of a club which he claimed was representing Sidebanders on a national basis. He wasn't at all happy about TAKE FIVE and our support of the plan, in fact his letter to me was rather blunt in telling me that neither he nor his group would *ever* support such a dumb idea since it didn't offer nearly enough frequency space for Sidebanders to operate. Basically, he said that if I knew what was good for me I had better heed his advice.

And so it went, and there were also letters from operators on the other side of the fence too. Operators in less populated areas were writing to beg me *not* to push for more than 5 of the upper frequencies at this time because there were barely enough Sidebanders in their areas to keep Channel 16 busy enough with Sideband chatter, much less keep 5 additional frequencies sufficiently occupied in order to let AM'ers know that they were off-limits because Sidebanders were using them!

In the mean time, much mail was also coming in from operators and clubs which seemed to feel that TAKE FIVE

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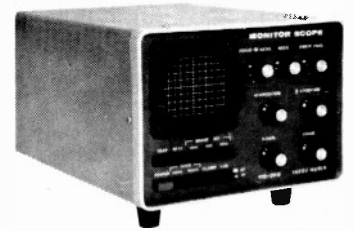
Total Spectrum Coverage from 160 thru 2 Meters



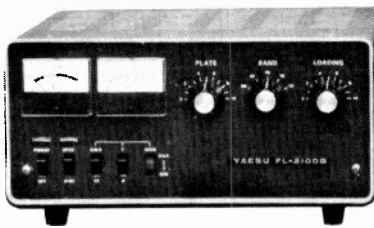
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hit the nail right on the head; many groups had taken up SSB NETWORK's old battle cry of "Use 'em or Lose 'em!"

And while it perhaps seemed to some that TAKE FIVE was random, hit-and-miss, or even an arbitrary decision, the idea was checked out against sales statistics and in-use reports of Sideband equipment from coast-to-coast. I had personally verified and felt that SSB NETWORK's idea was both sound and realistic and was equitable for the majority of Sidebanders on a national basis, and would not be counterproductive by offending AM'ers who might feel that Sidebanders were attempting to gobble up too many frequencies; the old *dog in the manger* routine!

So, after many months of assorted letters commenting on TAKE FIVE and related matters, in the August issue I announced a poll of my readers. I asked readers to speak out so that I could put it all together and get a good one-shot blast of opinions from around the country!

The letters poured in, and the response did confirm the fact that there were lots of people out there with opinions! About 3,800 readers took the time and trouble to send in everything from QSL cards to small volumes; they came in from individuals and from clubs. (No communication was noted from the infuriated club President in California, nor from anybody who reported being a member of the club he said he represented.)

More than 78%, about 3,000, of the response supported TAKE FIVE; 9% were against it because it did not cover enough frequencies; 6% said that it covered too many frequencies; and the remaining letters were either undecided, didn't care, or the opinions of the writers were too ill-defined to be counted in with any of the "sides" of the matter.

As an interesting sidelight to all of this, the September issue of another CB publication carried an interview with the very same California fellow who had waved his supposed members in my face in order to kill TAKE FIVE. Apparently he had a change of heart, since he is now spouting off about how he thinks that the top 5 frequencies are really the answer! He even went so far as to offer a rather poorly mangled version of *Use 'em or Lose 'em!*, the old battle cry of SSB NETWORK. His version was *If you don't use them, you're not going to keep them.*

That's the way the cookie crumbled in our reader poll. If you had opinions and didn't send them in, you can either be satisfied that it all worked out in a manner which was satisfactory to you, or you can gripe because

the poll didn't work out the way you had hoped it would.

SSB NETWORK *again* showed their time-tested ability to have their fingers on the needs of the Sidebanding community and to actively and aggressively set the pace for Sidebanding preferences for the majority of operators. And while they boldly emerge as the heros, *none* of these efforts will have *any* clout unless all of us, you, me, the next fellow or gal, actually make fullest possible concentrated use of .365 through .405 for Sidebanding; in addition to any of the Sidebanding frequencies from the "old 23" channel band, and in addition to any of the other frequencies between .315 and .355 which may be required in your region.

And while it's a matter of *Use 'em or Lose 'em!*, it is also *important* that you do more than just sit there and figure that the next operator is going to carry the ball on this. We're all in this together and, as has been oft times said, *united we stand, divided we fall.* I *urge* you to join, support, the SSB NETWORK; and I *urge* you to help to inform all AM operators in your area as to which frequencies are used by Sidebanders. Aside from educating them over-the-air, you can also spread the word by placing "AM Notification Mini-Posters" around at area CB shops, coffee breaks, jamborees, club meetings, etc. These mini-posters are filled-in (by you) with your local Sidebanding frequencies and request that AM'ers stay clear of them. They've been really effective!! Also, they are distributed to the entire Sidebanding brotherhood at no charge as a service of the SSB NETWORK; all they request is that clubs and individuals desiring these send along a self-addressed stamped brown envelope to use for sending out the mini-posters. I would suggest sending them a request for 10 of these mini-posters and enclosing a 9 by 12 inch brown envelope containing at least 35¢ in postage on it.

These are available to *all* members of the Sidebanding fraternity, clubs and individuals alike. Address your requests to Mini-Posters, The SSB NETWORK, P.O. Box 381-P, Smithtown, N.Y. 11787. While you're at it, if you don't already belong to the SSB NETWORK, ask them to send you a membership application—they deserve your support and the support of *all* responsible Sidebanders! *United we stand!*

CALLSIGNS

As you may know, FCC regulations call for the use of the assigned call-signs when you are operating. They don't mind if handles, Unit Numbers, or Sideband Numbers are used—but

such identification can be tolerated by the FCC only if used *in addition to* the FCC's call-signs.

AM'ers using *handles* seldom use their call-signs, however the FCC has not taken very much interest in this fact. The FCC *has* however gotten somewhat bent out of shape when Sidebanders forget to include their call-signs along with club ID numbers—although their main complaint seems to be manifested with those Sidebanders who are determined to operate on illegal out-of-band LF or HF frequencies. Possibly the lack of FCC call-signs is really used as a second brickbat to bash the operator over the head, in addition to the primary complaint about operating on unauthorized frequencies. First they started hounding those out-of-band operators using "HF" prefix ID numbers, now they have apparently expanded their operations to include those out-of-band communications identified solely by "Statewide Designate Whiskey numbers."

As a result of this, the FCC has just ordered eleven Sideband operators in eight states to show cause why their licenses should not be revoked because of alleged violations of the Communications Act by operating on HF frequencies.

The FCC *also* charged that the CBers identified themselves by so-called "W" or "Whiskey" designators in lieu of Commission call signs "in an organized scheme to operate radio transmitting apparatus illegally and to avoid detection."

Following is the list of those to whom the show cause orders have been issued:

George W. Caraway, Dallas, Texas (KJT-6608)
Joseph E. Castelletti, Jr., Largo, Florida (KWP-6796)
Jon B. Graskewicz, Pinckneyville, Illinois (KKA-2621)
Albert D. Kelley, Cascade, Montana (KFZ-6405)
Patrick T. Killday, Colorado Springs, Colorado (KWK-6235)
Raymond D. Lavergne, Crowley, Louisiana (KXO-1719)
Davis C. Montgomery, Marietta, Georgia (KNS-2827)
Michael J. Riley, Fairbanks, Alaska (KHK-0448)
William W. Robertson, Orlando, Florida (KXM-0433)
Emil Z. Smigelsky, Winter Park, Florida (KTC-2186)
Jimmy C. Tiece, Colorado Springs, Colorado (KSD-2898)

The message seems clear, stay on authorized frequencies, and use your FCC assigned call-sign *in addition to* your Sideband ID numbers; at least if you want to avoid one of the major

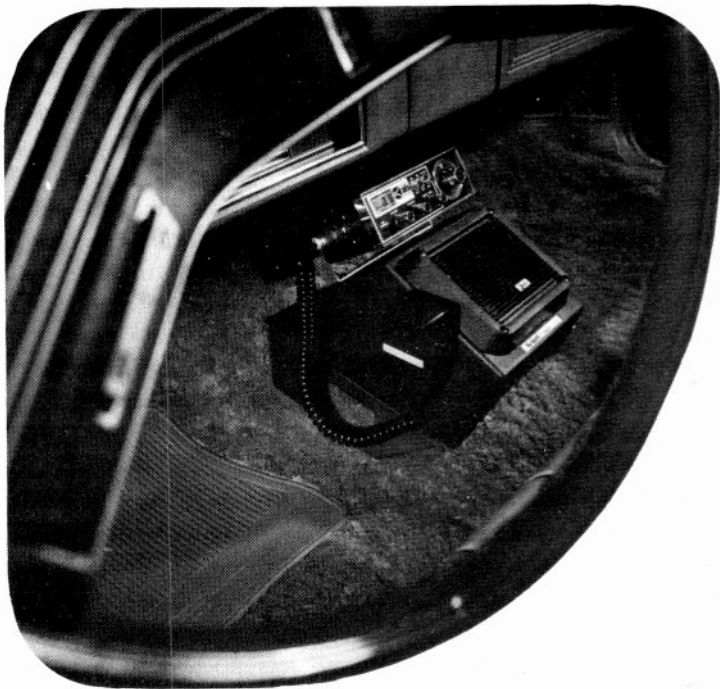
hassles that the FCC seems to be directing against Sidebanders. All responsible sideband organizations seem to be passing this word along to their members. It's good advice!

I must frankly admit that I had a lot more sympathy for out-of-band operators and operations when there were only 23 frequencies than I have now that there are 40. When there were only 23 channels many Sidebanders grumbled about lack of frequency space; now that we are trying to stir up as much Sideband operation as possible on the top five frequencies in order to keep them active with sideband transmissions, we are *still* faced with operators yakking above .405 while (in some areas) the AM'ers are knocking on the doors of Channels 36 through 40 because of lack of Sideband activity. So, I really must question whether any out-of-band operators, the operators who are continuing to direct FCC flak towards Sidebanders, are operating in

anybody's best interest. If additional or exclusive operating space is needed for Sideband operation, there are better ways of trying to obtain it than this. We think a barrage of petitions is one of the better ways, and we have told our readers how to obtain free copies of prepared petitions seeking additional Sideband frequency space.

NEW BOOKS

I saw an advance copy of Tom (SSB-13/TOMCAT) Kneitel's new *CB'ers SIDEBAND HANDBOOK*, written for *Hayden Books*. It's a top-notch book which covers the entire scope of Sidebanding like it's never before been done-up. It's written in Tom's informal, breezy, and easy-to-understand style and I think that every Sidebander will find it a useful book, chock-full of worthwhile data and sidelights on the *whole* Sidebanding scene. Look for it!



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ON ANTENNAS

BY BILL ORR

Frequency, Wavelength and "Loading"



LET'S look closer at the radio wave. The November column spoke briefly about the "mysterious undulations in the ether" noted before the turn of the century. By 1880 it was known that the earth was bombarded by energy from outer space from countless sources. Some waves are useful (sunlight) and some may be dangerous (x-rays). Others are still not fully understood (cosmic rays).

The waves from space arrive helter-skelter fashion but the waves themselves are orderly and have their own characteristics. Taken as a whole, they make up the *electromagnetic spectrum* (Figure 1).

All of these waves, constantly in motion, vibrate in typical fashion at definite frequencies; the number of complete waves per second (one cycle per second) is called one *Hertz*, with the wavelength decreasing as the frequency increases.

By 1900 it was possible to measure the wavelength of radio waves, x-rays and cosmic rays. As the various waves were investigated and measured, they were

grouped into *wave bands*, which are groups of waves having similar characteristics, measured in a similar fashion.

High frequency radio waves (including the radio waves used for CB) can be generated by a radio transmitter and converted into electromagnetic waves by an antenna. The radio field set up about the antenna is transmitted through space at the speed of light (186,000 miles per second) and is captured by a second antenna, converted back into electrical energy capable of being detected by a radio receiver.

The Two-Way Antenna

It was discovered early in the game that an antenna acts in the same manner whether it is transmitting or receiving radio energy. Thus the general antenna characteristics (gain, etc.) are the same in either instance. For simplicity, then, we can talk about a particular antenna in terms of transmission or reception, with the assurance that the observations noted in one case apply to the other.

Antenna Resonance

Radio energy is radiated into space and retrieved from space by an antenna. Basically, an antenna is any length of metal that conducts electricity and is surrounded by space. High frequency electrical energy flowing in the antenna sets up an electromagnetic field *about* the antenna which expands into space at the speed of light. Conversely, an electromagnetic field meeting an antenna sets up a high frequency electric current within the antenna. Thus, *any* conductor of electricity functions as an emitter or receptor of radio waves, with a varying degree of efficiency (Figure 2).

For highest efficiency, the antenna must bear a relationship to the length (size) of the radio wave. In the early days of "wireless", wire fences were often used for reception and crude "cage" antennas of many wires were used for transmission without any real concept of trimming or otherwise adjusting the length of the antenna to the length of the radio wave. "The bigger the antenna, the better the reception", was the motto. Such antennas, of course, were very inefficient.

A great body of literature exists today attesting to the many varied and important contributions made by numerous experimenters in the quest for better and more efficient antenna systems. Early in the game, it was found that an antenna of a certain length did not

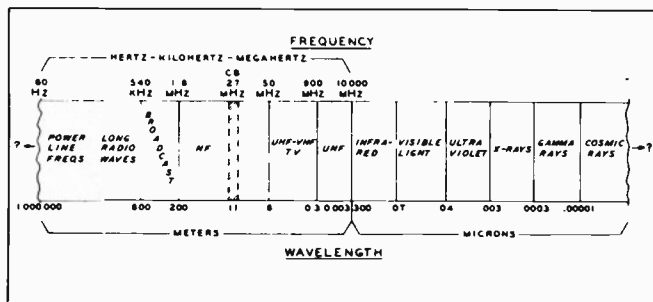
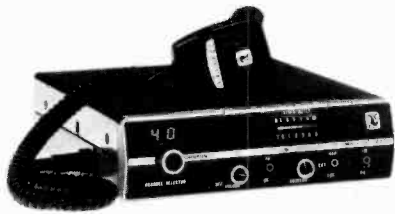


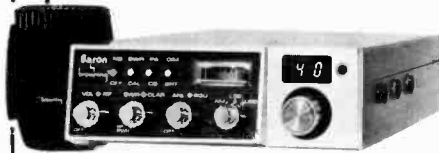
Fig. 1—THE ELECTROMAGNETIC SPECTRUM is a chart showing the relationship between electromagnetic waves arranged by size (wavelength). At the low frequency end of the spectrum are the extremely large radio waves useful for long distance daylight communication. Huge antennas are required to radiate these big waves. The regular broadcast band encompasses medium size waves and still shorter (smaller) waves are useful for long distance, ionospheric-reflected radio communication. The CB channels fall in this range at about 11 meters wavelength. Very short radio waves are used for radar and point-to-point short range communication.

Gradually, the extremely short radio waves blend into infrared waves, and at still shorter wavelengths, the electromagnetic waves are visible to the eye as light waves. Shorter than light are ultraviolet waves, X-rays, gamma rays and cosmic waves. The size of these tiny waves is expressed in terms of millionths of an inch. Even so, they are identical to the larger radio waves used by CBers.

What waves, if any, exist beyond the ends of the electromagnetic spectrum chart? Scientists suspect that super-long waves may be found in the form of gravitational waves and that micro-miniature waves shorter than cosmic waves exist in the universe. No one is sure about super-long or super-short waves and the puzzle is to find them, as man seeks to learn more about the mysterious universe and all the electromagnetic waves that surround us.



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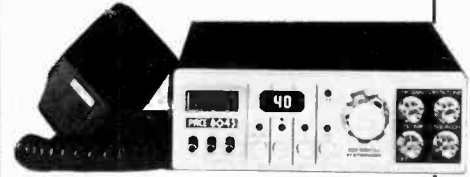
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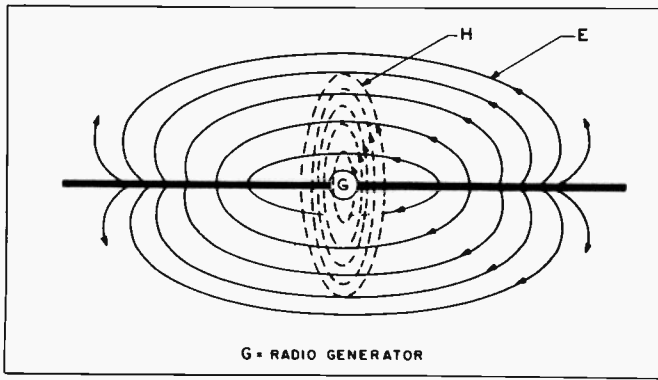


Fig. 2—MODERN CONCEPT OF A RADIO WAVE is a combination of magnetic (H) and electric (E) fields set up about an antenna as a result of electric current flowing within the antenna. Energy is transferred back and forth from one field to the other. This action is termed "oscillation". During energy transfer, which can occur millions of times per second, fields may become detached from the wire and move off into space. A radio signal is apparently made up of the two fields which reinforce each other, with the electromagnetic energy radiating outwards from the antenna. The sum of the two fields is called an "electromagnetic field". If the field cuts another conductor (antenna), some of the energy in the field will set electrons in motion in the conductor. The electron movement (current) may be detected by a radio receiver.

exhibit the same characteristics at all frequencies. Best results were obtained when the antenna was adjusted physically or electrically to be in proportion to the length of the radio wave. If the antenna was shorter than the wave, extra wire could be added in the form of a coil to make the antenna electrically longer. The coil was called a *loading coil* and it is still known by that name today. If, on the other hand, the antenna was too long, a capacitor could be added in series with the antenna to make it electrically shorter. The antenna and the coil or capacitor combination could thus be adjusted to the condition of *resonance*, or electrical compatibility with the radio wave in use (Figure 3).

Resonance and Antenna Length

For any antenna there is one frequency, called the *resonant frequency* at which various electrical characteristics of the antenna are in a state of electrical balance, and at which frequency the antenna is in a condition of maximum efficiency. The resonant frequency is a function of the *electrical* length of the antenna, which may or may not bear a relationship to the physical length in feet and inches (Figure 4). Any antenna may be tuned to resonance by means of auxiliary gadgets, but such devices are a nuisance and of questionable efficiency. A resonant antenna requires no such devices and is a simple and efficient radiator and receiver of radio energy. The length of the radio wave and the antenna are expressed in terms of *wavelength*, and that term is directly related to the *frequency* of the radio wave, as we'll see shortly.

Wavelength and Frequency

Radio waves exist because it takes a certain amount of time for electrical energy to travel from point to point. When a pebble is dropped into water, the re-

sulting disturbance does not reach the edge of the pool immediately. Rather, a wave of water starts out from the spot where the pebble hits and proceeds towards the edge of the pool at a definite speed. Electrical energy normally travels at 186,000 miles per second (or 300,000,000 meters per second). Thus, if a radio antenna is emitting a short pulse of radio energy at the rate of 27,000,000 pulses per second (27,000 kHz—the CB band), one single pulse will travel about 36 feet (11 meters) before another pulse is emitted.

At one extreme, at 186,000 pulses per second, the distance between pulses is nearly a mile (5,000 feet). This radio wave has a very long wavelength. And at 3,000,000,000 pulses per second (3,000 gigacycles), the distance between pulses is only about four inches. This corresponds to a radar signal. And so, exactly as in the case of the pebble dropped into water, a mathematical relationship exists between the distance a radio pulse will travel during the time required for one pulse (one cycle) to occur, as shown in Figure 5.

The length of any electromagnetic wave (radio, light, heat, etc.) can be determined by the simple formula:

$$\text{Wavelength in meters} = \frac{300,000,000}{\text{frequency in cycles per second}}$$

In the case of CB radio, the wavelength is expressed more conveniently as:

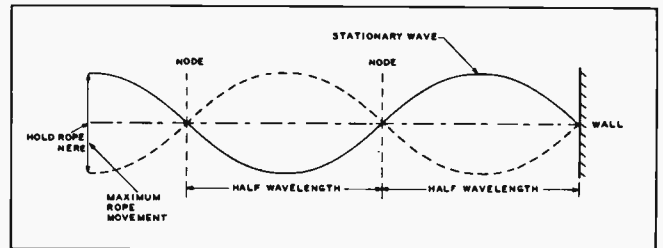


Fig. 3—RADIO WAVELENGTH. A simple case of wavelength brought about by the reflection of a wave can be observed when a rope is given a quick series of flips. A wave travels along the rope until it reaches the far end, from where it travels back along the rope to your hand, continuing back and forth in this manner until the motion dies out. By flipping the rope in the proper sequence, you can make the wave continue to run back and forth along the rope.

With a little practice, you can flip the rope in the proper sequence and a succession of waves at equal intervals will travel along the rope. When reflected back from the far end, they meet the oncoming waves whose lengths are equal to those waves coming from the far end of the rope. At some points, the conflicting waves reinforce each other and at other points the rope seems to not move at all. Points of zero movement are found along the rope one-half wavelength apart; at all other points the rope vibrates. The vibratory pattern is called a "stationary wave", or "standing wave", as the overall wave pattern moves neither forward nor backward. The points of no movement of the rope are called "nodes". The stationary wave on the rope is trapped between your hand and the other end of the rope, and by experimenting, you can get various numbers of standing wave nodes on the rope, depending upon the rate at which you flip the end.

Stationary waves of this type may be set up in an electrical circuit, or along an electrical conductor by electrical impulses applied to the circuit or to the conductor. Such a conductor is called an "antenna". Shown in this picture is an antenna having a standing wave on it, with three nodal points. A half-wavelength exists between any two nodal points. In the case of a CB radio wave of 11 meters length, the distance between adjacent nodal points is about 18 feet.



Fig. 4—The CB quarter-wavelength "whip" antenna (which is normally over 100 inches long) is compacted into a shorter length by the addition of a loading coil at antenna center. This compact whip is intended for truck use where the over-head clearance is marginal (Photo courtesy of Breaker Corp.).

$$\text{Wavelength in meters} = \frac{300}{\text{frequency in megahertz (MHz)}}$$

The illustration tells the story better than words.

Measurements in the United States are usually expressed in feet and inches rather than meters and centimeters. This formula, converted into more familiar terms, then, is:

$$\text{One Wavelength, in feet} = \frac{984}{\text{frequency in megahertz}}$$

And, finally, a half-wavelength is determined by dividing the formula by 2, thus:

$$\text{One-half wavelength in feet} = \frac{492}{\text{frequency in megahertz}}$$

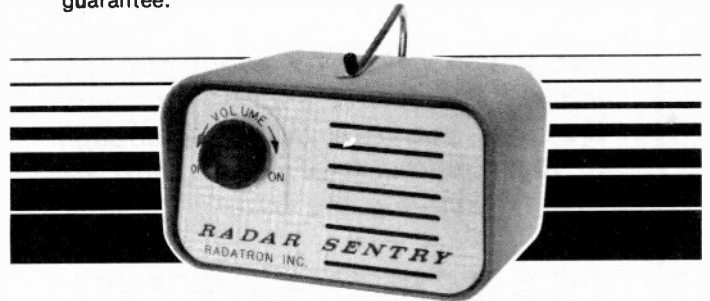
This is the fundamental formula from which many significant lengths in antenna work are developed and is defined as the *electrical* length of a half-wave element, when no factors exist that modify the speed of the radio wave. In real-life situations, many factors exist that alter the *physical* length of a half-wave antenna. If this were not true, there would be no need for extensive engineering laboratories to design and build practical antennas!

End Effect and Antenna Thickness

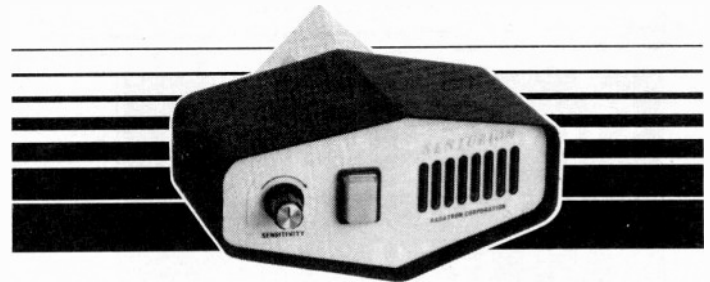
End effect and *element thickness* of the antenna must be taken into account when determining the actual physical length of any antenna. The end effect is caused by the presence of insulators or other material (even air) that may be used to support or otherwise surround the tip of the antenna, and also by the abrupt

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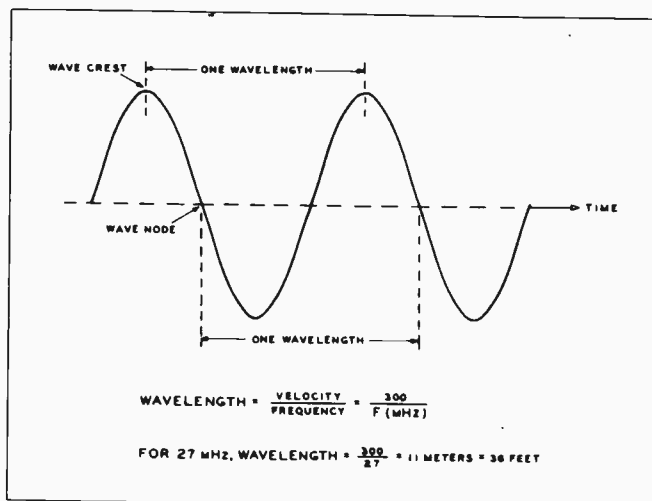


Fig. 5—WAVELENGTH AND FREQUENCY are related to each other by a simple formula, as explained in the text. The wavelength is the distance between two wave crests (or between two wave nodes). The velocity (speed) of the electromagnetic wave is 300,000,000 meters per second, the same as the speed of light. The frequency, or repetition rate, of the wave is the number of waves which pass a given point in one second. Wavelength is measured in units called "meters", one meter being equal to 3.28 feet. The frequency is measured in "cycles per second", or units called "Hertz". Thus, one cycle per second is one Hertz.

Since wavelength and frequency have an inverse relationship, it follows that long waves have a low frequency and short waves have a high frequency.

transition from the antenna to the surrounding non-conductive medium at this critical point.

Since practical antennas have thickness as well as length, the actual length departs from the formula length to a small extent. Generally speaking, the larger in diameter the antenna, the greater departure from the electrical wavelength. Thus, for any given frequency, an antenna having a small cross-sectional area in the conductor will be longer physically than an antenna having a larger cross-sectional area.

Very Short Antennas

The physical length of an antenna often poses a problem, especially for portable or mobile work in a vehicle or boat. It is possible to use a very short antenna at a sacrifice in overall efficiency and electrically "load" it so that it appears electrically as an antenna of greater length. The missing portion of the antenna takes the form of a *loading coil* of wire wound on an insulated form (or supported by its own rigidity). The coil, for simplicity's sake, can be thought of as the missing antenna length, wound up into a compact structure to make up for the missing physical length. The coil may be placed at one end of the antenna, or at some point along the length of the antenna. You see these coils as bulges at the base of the antenna (Figure 6), or at mid-point. Coil design is crucial, as is construction, and the efficiency of the antenna depends upon the skill of design and manufacturing, and the expertise of the person making the antenna installation. It's not a game for beginners.

In all cases, the portion of the antenna wound up in the coil *contributes nothing* to the radiation capa-

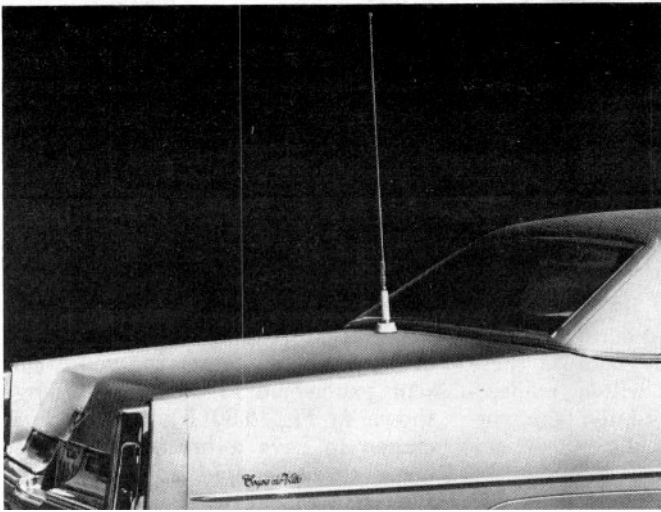


Fig. 6—This compact CB antenna is base loaded. The loading coil is visible just below the spring at the bottom of the antenna. (Photo courtesy the Breaker Corp.).

bility of the antenna. Usually, the smaller the antenna in relation to the operating wavelength, the bigger the loading coil and the lower the antenna efficiency—and the weaker your signal. There is no substitute for a full-size resonant antenna!

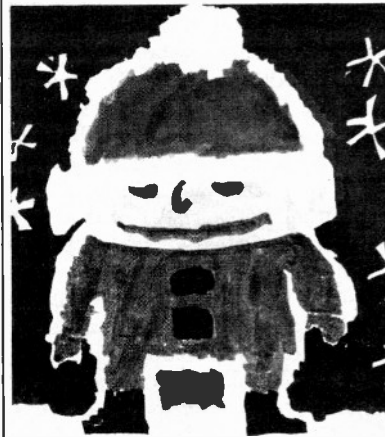
Summary

The radio wave is an electrical "undulation" which is a portion of the electromagnetic spectrum. It is defined in terms of size (wavelength) and frequency (cycles per second). It can be radiated and intercepted

by an antenna which converts radio waves into high frequency electrical energy and vice-versa. The antenna has the same characteristics when transmitting or receiving and has the greatest efficiency when it is in a state of resonance.

More specific information on loaded whip antennas and mobile antennas of all types is contained in "The Truth About CB Antennas", available from Radio Publications, Inc., Box 149, Wilton, CT 06897. Price, \$5.95 plus 50¢ for handling and shipping.

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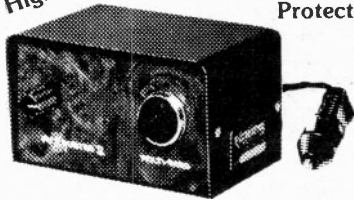
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BASIC RADIO

BY IRVING TEPPER

Part 22 • Power Supply Regulation



ALL devices that supply DC power to a load have internal resistance as shown in Fig. 8.28. If the load current varies, the current flowing through the internal resistance, R_i , varies (series circuit) and the voltage drop across R_i varies. If the voltage drop across R_i changes, the output voltage *must* change. This problem holds true for DC generators, batteries and power supplies. Power supplies have the added difficulty of the output voltage varying when the line voltage changes as it does very often. The best power supply design can only *minimize* the regulation problem but cannot eliminate it. Because some types of equipment *must* have a well regulated voltage source some means must be found to deal with the problem. Improved regulation of power supply output voltage is accomplished by *parallel* or *series voltage regulator* circuits.

Parallel Regulators

The basic concept of the parallel regulator is shown in Fig. 8.29. If the resistance of R_L is decreased the current through R_i increases, increasing the voltage drop across R_i . This, in turn, reduces V_O . Increasing the resistance value of R_R *reduces* the current flow through R_i , *reduces* the voltage drop across R_i and increases V_O . If R_R is adjusted to exactly counteract the current change due to R_L , the output voltage will *remain unchanged*.

If R_L should increase in value, draw less current, the output voltage will rise. Readjusting R_R to draw more current will bring V_O back to normal. In each case the sum of I_{RR} and I_{RL} are the same. By compensating with R_R we are maintaining a constant current drain and thus a constant output voltage. The basic problem that re-

mains is *how* to vary R_R to compensate for changes in load current. It cannot be done manually because these changes often occur within milliseconds and end as abruptly; the correction must be automatic.

There are two devices that may be used to replace R_R . Each of them will automatically vary their internal resistance as the voltage in the circuit changes. One such device is the *zener diode* and the other is a *gaseous voltage regulator* tube. The zener diode is associated with low voltage solid state circuits and the tube, referred to as a VR tube, is associated with higher voltages required for vacuum tube circuits.

Zener Diodes—The regulator circuit using a zener diode is shown in Fig. 8.30(A). Note that the zener diode has replaced R_R of Fig. 8.29 and that resistor R_S has been added to the circuit.

To understand the operation of this circuit we must first be aware of the characteristics of the zener diode. A zener diode has essentially the same characteristics as a conventional diode except that it is capable of operating in the avalanche or breakdown area and recovering. In fact, a zener diode, when operating properly, is *always* in the breakdown area as shown in Fig. 8.30(B). Examining Fig. 8.30(B) further we see that as the reverse voltage is increased the reverse leakage current increases slightly. When the breakdown point, V_Z , is reached the reverse current increases very rapidly for a small increase voltage. It is this feature that permits the zener diode to be used as a voltage regulator.

In the circuit of Fig. 8.30(A) the diode is connected across the load in the reverse direction (non-conduc-

ting) and the circuit is fed from an unregulated voltage source. The value of R_S is chosen to set the zener current somewhere in the current range shown in Fig. 8.30(B). The diode is chosen to have a breakdown voltage equal to the output voltage desired. For example, if a 9 volt output is needed a 9 volt zener is selected. The applied unregulated voltage, V_{in} , must be high enough to place the zener in the breakdown area.

To analyze the circuit operation and the relationship between the various currents and voltages, example Fig. 8.31. In (A) we see how the total input current, I_T , splits between the zener diode and R_L . The currents then recombine and flow through R_S . From this we can see that

$$I_T = I_Z + I_{RL}$$

$$I_{RS} = I_Z + I_{RL}$$

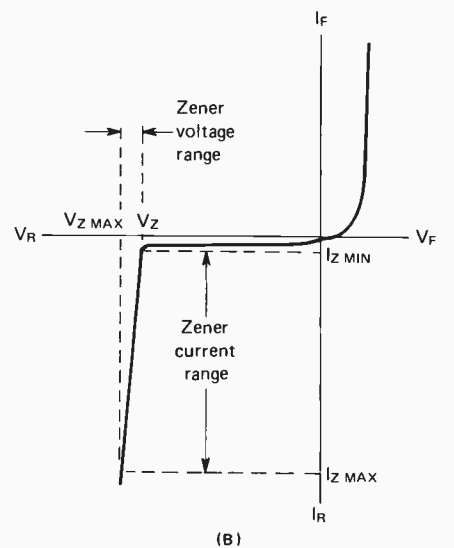
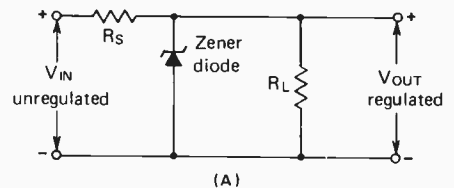


Fig. 8.30(A)—A basic shunt regulator circuit using a zener diode. The zener diode adjusts its internal resistance, automatically, to correct for changes in input voltage or load current. **(B)**—Characteristic curve for a zener diode is the same as for a conventional diode. The major difference is that a zener can operate in the avalanche or breakdown region while the ordinary diode cannot.

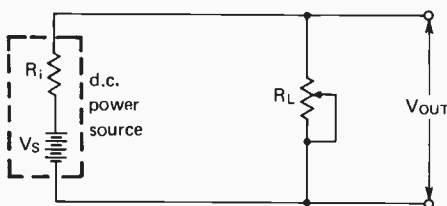


Fig. 8.28—All power sources have an internal resistance, R_i , that affects regulation. The lower the value of R_i the better the regulation. As batteries age their internal resistance, R_i , increases until, finally, they must be discarded.

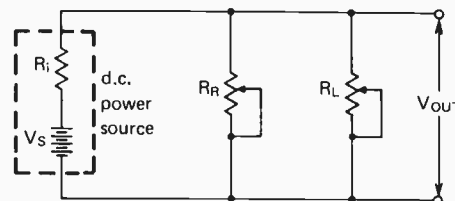


Fig. 8.29—Resistance R_R acts as a manual parallel regulator. Adjusting R_R to compensate for changes in load current, maintains a constant output voltage.

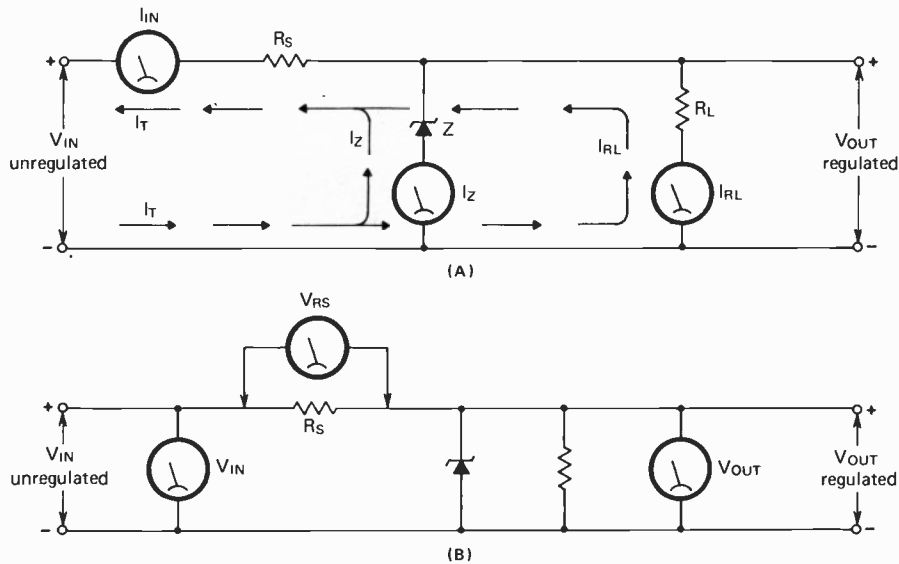


Fig. 8.31(A)—Current paths in a zener diode regulator circuit. (B)—Voltage distribution in the zener diode regulator circuit.

The voltage distributions are shown in Fig. 8.31(B). Note that \$V_{RL}\$, \$V_Z\$ and \$V_O\$, in parallel, all have the same voltage. Note also that \$V_{RS}\$ must equal \$V_{in}\$ less \$V_O\$. Expressed mathematically, we have

$$\begin{aligned} V_O &= V_{IN} - V_{RS} \\ V_{RS} &= V_{IN} - V_O \\ V_O &= V_Z = V_{RL} \end{aligned}$$

With these points in mind, consider the regulating action that occurs when \$R_L\$ increases in resistance thus reducing the load current. As the load current reduces, the current flow through \$R_S\$ (\$I_L + I_Z\$) must reduce. This causes \$V_{RS}\$ to drop in value. When \$V_{RS}\$ reduces, \$V_O\$ increases. As \$V_O\$ increases the voltage across the zener rises. As the voltage across the zener rises the zener current, \$I_Z\$, must increase as shown in Fig. 8.30(B). *The Zener current increases by the exact amount the load current decreased.* As a result \$I_{RS}\$ remains the same, \$V_{RS}\$ remains the same and so \$V_O\$ remains the same. In reality there is a slight change in the output voltage; \$V_O\$ will vary over the zener voltage range shown in Fig. 8.30(B).

Conversely, if the load current increases, the current flow through \$R_S\$ increases and \$V_O\$ starts to drop. As \$V_O\$ starts to drop the zener current starts to drop compensating for the increased \$I_{RL}\$. The result is, again, a constant current through \$R_S\$ and a constant value of \$V_O\$ over the zener voltage range in Fig. 8.30(B).

The current range over which the zener diode will regulate is limited. As the load current increases, \$I_Z\$ decreases to maintain a constant value through \$R_S\$. If, however, the zener current drops below 2 or 3 mA the zener will drop out of avalanche, conduct no current but the leakage and

thus stop regulating. On the other hand, if the load current drops lower and lower, \$I_Z\$ must increase by a like amount until finally, \$I_Z\$ exceeds its maximum rating, overheats the zener and burns it out.

Calculating \$R_S\$—To determine the required value of \$R_S\$ we must assemble the following information

- 1—\$V_{out}\$
- 2—\$I_{L, maximum}\$
- 3—\$I_{Z, minimum}\$
- 4—\$V_{in, minimum}\$

Applying Ohm's law, we have:

$$R_S = \frac{V_{in, min} - V_O}{I_{Z, min} + I_{L, max}}$$

To illustrate the application of this formula consider a regulator circuit using a 5V zener diode to provide a 5V output. The maximum load current will be 125 mA and the power supply output will be 14 volts minimum. Determine the value of \$R_S\$.

$$\begin{aligned} V_{out} &= 5V \\ I_{L, max} &= 125 \text{ mA} \\ I_{Z, min} &= 4 \text{ mA (an assigned or chosen value)} \\ V_{in, min} &= 14 \text{ V} \\ R_S &= \frac{V_{in} - V_O}{I_Z + I_L} \\ &= \frac{14 - 5}{125 \times 10^{-3} + 4 \times 10^{-3}} \\ &= \frac{9}{129 \times 10^{-3}} = 69.7\Omega \end{aligned}$$

Determine the power rating required for the series resistor as follows:

$$\begin{aligned} P_{RS} &= E_{RS} \times I_{RS} \\ &= 9 \times 129 \times 10^{-3} \\ &= 1.161 \text{ W} \end{aligned}$$

A 2 watt rating would be suitable for \$R_S\$.

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Information Sheet #16—Integrated Circuits

When transistors were first introduced, new circuit theory, engineering processes and manufacturing systems had to be developed. Because of this the impact of the transistor was felt very gradually. It took many years for the transistor to replace the vacuum tube and, in fact, it has not done so, completely, as yet.

The technology developed by the transistor industry has, comparatively rapidly led, step by step, through the reduction of size and the combining of several transistors and components into one package, to the *integrated circuit* or IC. All the components of a circuit and their interconnections are produced within a solid piece of semiconductor material on a *molecular level* by a variety of techniques. An integrated circuit combines and interconnects hundreds of components such as diodes, transistors, zener diodes and resistors on a semiconductor base called a *substrate*. The entire integrated circuit, called a chip, may be no larger than 40 thousandths of an inch square and a few thousandths of an inch thick. As the number of components that could be included in an integrated circuit increased several general classes of IC's developed. These are called small scale integration, medium scale integration and large scale integration (SSI, MSI, LSI).

By the use of highly sophisticated construction techniques, complex circuits are developed in IC's that make possible such devices as desk calculators, computers, microprocessors, digital clocks and a host of other electronic devices that are now appearing in the electronic and automotive fields.

Advantages—The advantages of the integrated circuits are many. Once the IC is developed and a great number manufactured, the unit price can be lowered. It is simply a matter of earning back the cost of the circuit design, the development of the chip and the initial cost of the production machinery. Typical examples of the drop in cost after the initial develop-

ment of the chip are the calculator and digital watch.

The IC has reduced labor costs, increased equipment reliability and reduced the size and weight of electronic equipment. It has reduced the number of parts that have to be stocked for repair purposes since one IC is the equivalent of possibly 200 or more separate parts.

Another peculiar advantage of the IC is that engineers and technicians no longer have to design circuits using discrete components. We use the ICs in circuits provided by the IC manufacturer who had to do the design work prior to building the IC.

The IC does have some disadvantages. A fault in any part of the IC requires replacement of the entire unit. Some replacement ICs are hard to find and there is little or no interchangeability between the ICs.

Packaging—To date the industry has developed several packages for the IC. The first is an adaptation of a transistor package, the TO-5 can, shown in Fig. 1. The major disadvantages of this housing are that its shape does not match that of the chip and the number of leads that can be used for connections are limited by the perimeter of the housing.

The flat package was designed to accommodate the shape of the chip and is called the *flat pack*. A typical 14 lead flat pack is shown in Fig. 2.

An improved version of the flat pack is the dual-in-line package called the DIP and shown in Fig. 3(A). The dip package is made with 6, 12, 14 or 16 leads. They have an indentation and/or a dot at one end for mechanical indexing to insure installation in the proper direction.

Some IC's, particularly voltage regulator types with only three connecting leads, are housed in power transistor cases as in 3(B).

Typical IC—A typical integrated circuit is the Sprague Electric Company's ULN2274 dual audio power amplifier intended for use in small stereo receivers or phonographs. The chip layout is shown, greatly magnified, in Fig. 4. Its normal size is 0.091"

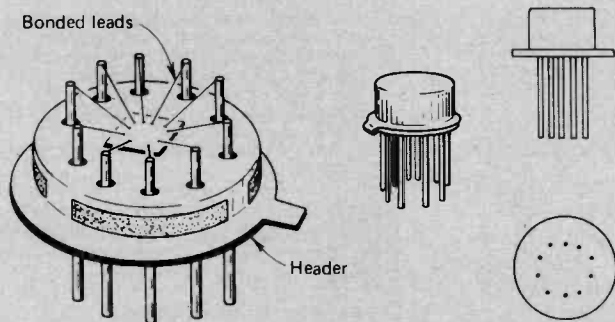


Fig. 1—How an IC chip is mounted in a TO-5 transistor case.

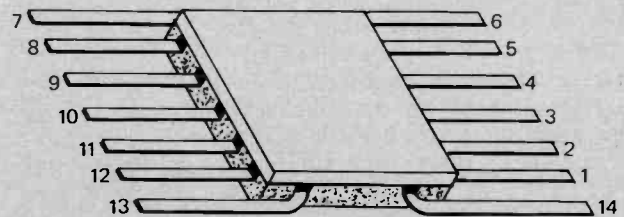


Fig. 2—Construction and appearance of a 14 lead flat pack.

by 0.072". The actual schematic diagram of the circuit is shown in Fig. 5. It contains approximately 50 transistors, 5 diodes, one zener diode and about 40 resistors.

The application circuit recommended by the manufacturer is shown in Fig. 6. Note that this diagram does not indicate the internal circuitry of the IC. It merely tells you how to connect the IC to the external circuit, what components are required and where the input and output terminals are.

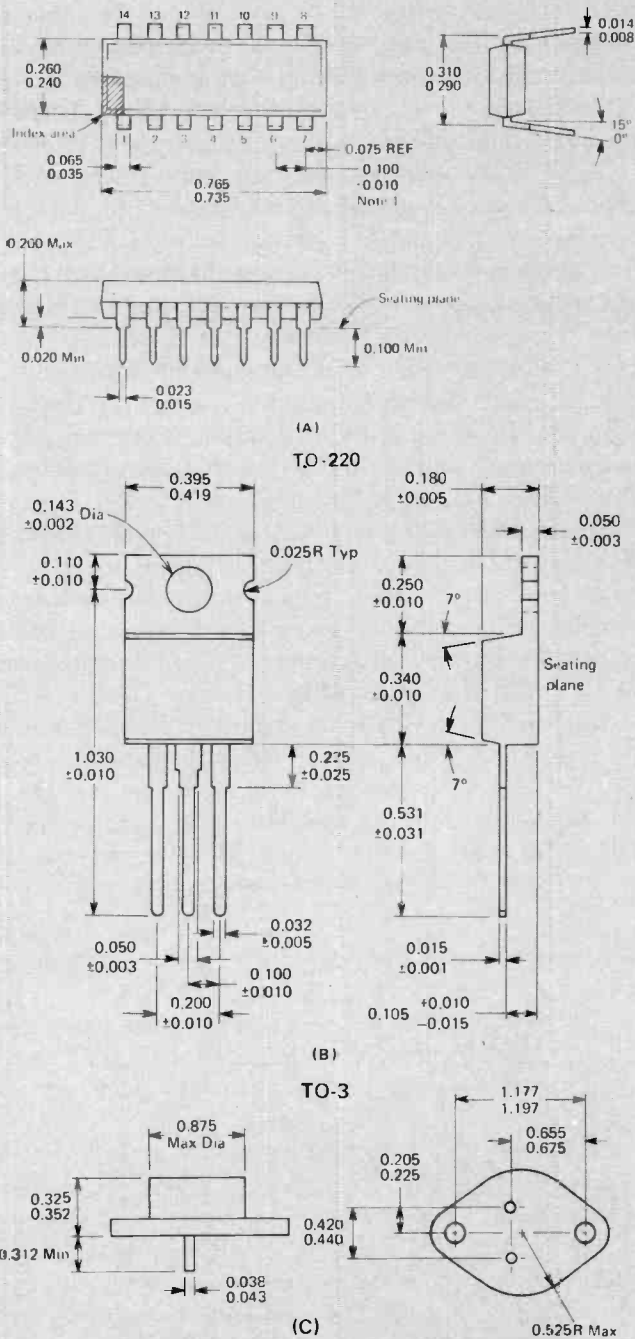


Fig. 3(A)—Appearance and dimensions of a 14 pin dual-inline (DIP) package. The 0.1 inch spacing between pins is standard and guides the spacing holes on many printed circuit boards. (B)—Three lead ICs such as regulators are encapsulated in a power transistor case such as the TO-220 and TO-3.

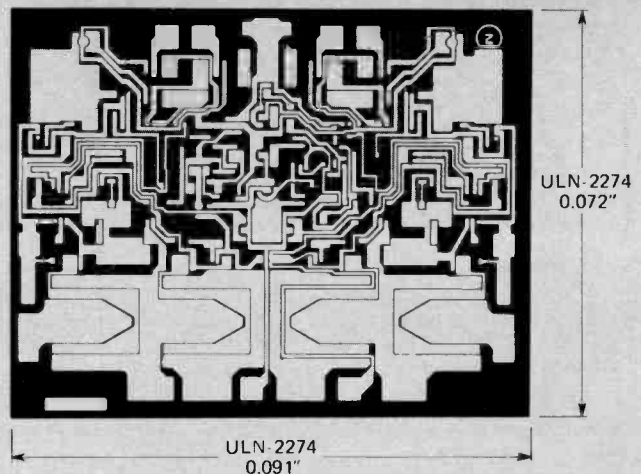


Fig. 4—Internal layout of a dual audio power amplifier chip that measures 0.091" by 0.072". Courtesy of Sprague Electric Co.

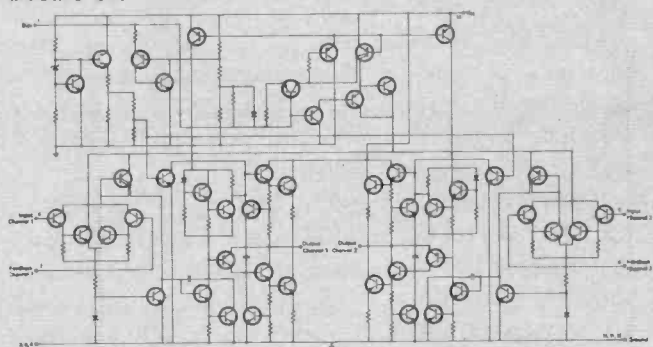


Fig. 5—Actual circuit of IC chip shown in Fig. 4.

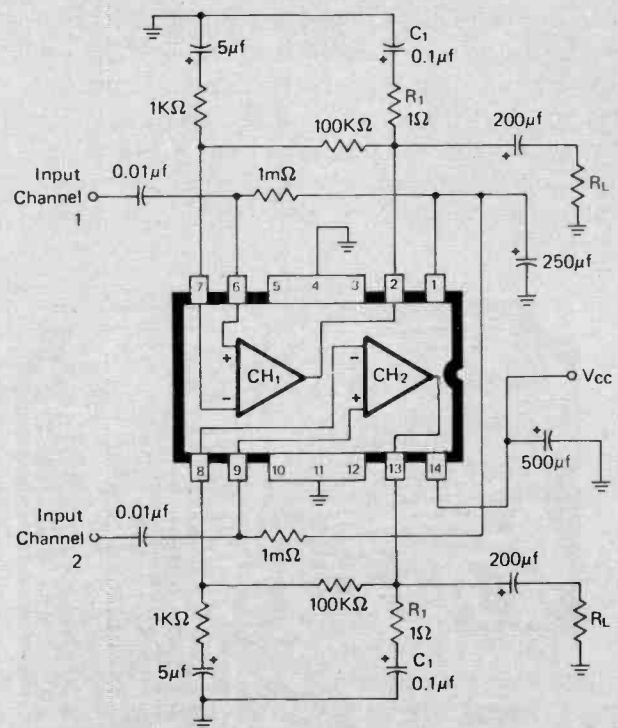


Fig. 6—Circuit showing a two channel audio amplifier using the IC described in Figs. 4 and 5. Two speakers are connected into the circuit in place of the resistors marked R_L .

Information Sheet #17—Printed Circuits

The first printed circuits were developed during World War II when the National Bureau of Standards tried to develop a technique to bring electronics production up to a mechanized state rather than the handwiring method prevalent at the time. They developed circuits of silver paint applied through a stencil and fused at a temperature of 538°C (1000°F). Because of the high fusion temperature a ceramic base was all that could survive the process. Further experimentation led to the present day technique of bonding copper foil to a fibre or glass epoxy board.

The major advantages of printed circuits are that they can be made by automatic machinery, they have a high degree of uniformity, wiring errors are eliminated, lead positioning problems no longer exist and weight and size are reduced.

Printed circuits are used mainly by the electronics manufacturer. The hobbyist uses a printed circuit board when he buys and builds a kit. If a hobbyist should want to build a unit described in a magazine article, the author usually provides a full size copy of the printed circuit layout so that it can be reproduced through a photographic process or the article will contain an address where the board and any special components can be ordered. A typical printed circuit board from a kit is shown in Fig. 1.

What does a technician or hobbyist do if he is going to build a single unit of his own design? It simply does not pay to lay out a printed board and then fabricate it by one of the various methods available. There are several approaches available to the experimenter. One approach is the use of a perforated

board in which pins may be inserted. As shown in Fig. 2, the pins are located where necessary to permit the mounting of parts in order to wire the circuit. The components and wiring may be placed on one side of the board or the components on one side and the wires on the other. Care should be taken, when designing the layout, to use the fewest number of terminals and wires and the least amount of space.

Another approach is the universal wiring board made by the Vero Electronics Company and shown in Fig. 3. This board provides parallel copper tracks spaced 0.1" on center running the length of the board and holes in the copper track also spaced 0.1" apart. This spacing is standard to accept the pins of a DIP IC package. (See Fig. 3A in Info. Sheet #16.) The basic idea, when using the board, is to arrange the components in such a way that they are electrically connected by the copper tracks. The copper tracks themselves can be interrupted where necessary by cutting them with a drill bit or a cutter available from Vero (Fig. 4).

When designing a circuit layout on Vero board it is helpful to use a layout sheet available from Vero and experiment on paper to find the best arrangement for parts and wires. One such layout and circuit are shown in Experiment #30, Construction of a Regulated Power Supply.

Still another device is the universal IC card sold by Radio Shack and others. This board, called the Op Amp board, is punched on 0.1" centers and has the copper foil laid out in such a way as to permit DIP IC's to be mounted along with the necessary components and wires. The board has a narrow end

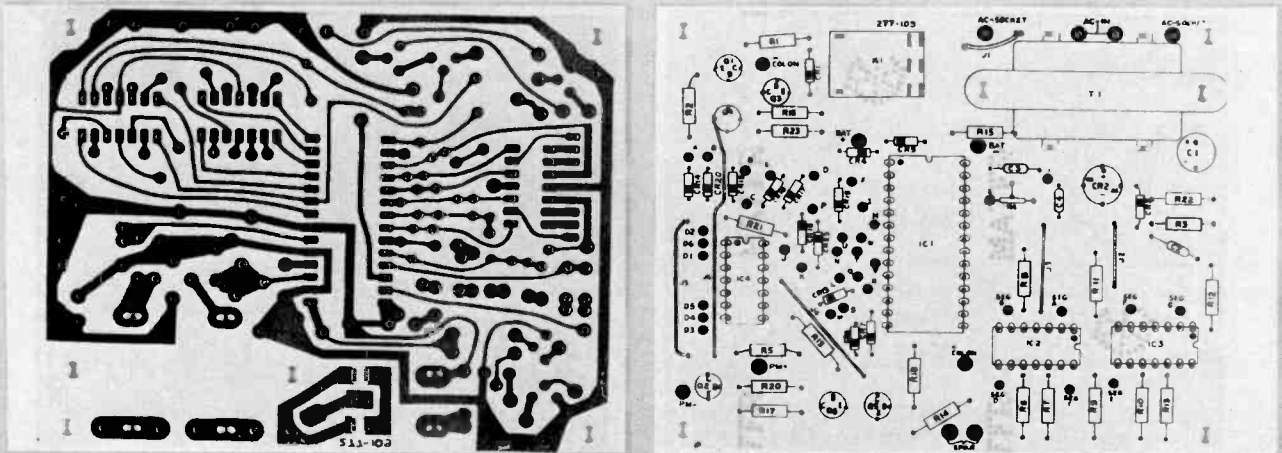


Fig. 1—Top and bottom views of a printed circuit board designed for a digital clock. The outlines of the components and their identification numbers are stenciled on the front of the board to simplify assembly. The dark areas on the rear of the board are copper. (All photos by I. Kahn.)

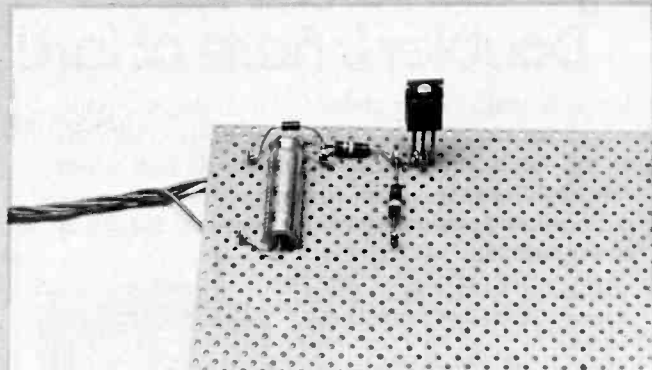
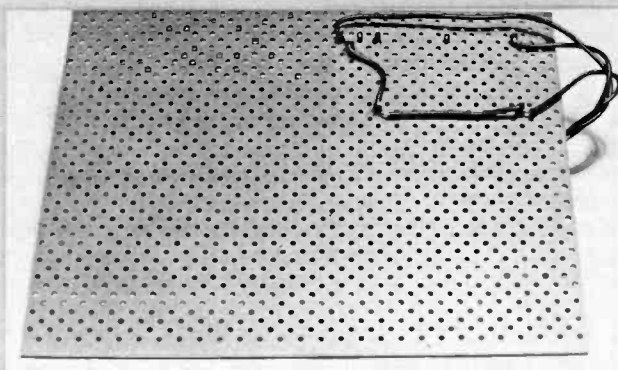


Fig. 2—A simple circuit assembled on pins that can be inserted anywhere on the perforated board. The board and pins are available from Radio Shack. (Board #276-1392; pins #270-1394)

that can be plugged into a matching socket. By using this type of board and socket, complete systems can be assembled from plug-in units providing a high parts density. See Fig. 5.

Soldering on Printed Circuit Boards—Before placing the parts on a printed circuit board all oxides must be removed from the copper. If not done it will be impossible to solder to the copper areas. This can be accomplished by *lightly* scrubbing the copper foil with 0000 (four oh) steel wool. *Be sure to remove all traces of the steel wool* before assembling the parts on the board. It is also advisable to clean the component pig-tails so that they will accept solder easily.

Mount the parts on the side of the board that has no copper; where the wires pass through the copper on the back of the board they may be soldered. Great care must be taken when soldering to the copper areas as too much heat can burn or oxidize the copper. The heat *must* be kept to a minimum. Be certain to use small diameter 60-40 solder and a low wattage iron with a narrow tip. It is often necessary to reduce the heat of the soldering iron to safeguard the copper foil on a board. A device that will

enable you to do this is described in Experiment #29, Soldering Iron Heat Controller.

When soldering components to the foil, great care must be taken not to bridge two copper areas with excess solder. As you can realize, with 0.1" spacing, center to center, the copper areas are very close. To prevent bridging, a very narrow tip must be used on the iron as well as small diameter solder (0.050"). If your soldering iron tip is too broad wrap it with #8 or the #10 wire as shown in Fig. 6.

Removing Components from the Board—When removing components from a printed circuit board one must be even more careful not to destroy the

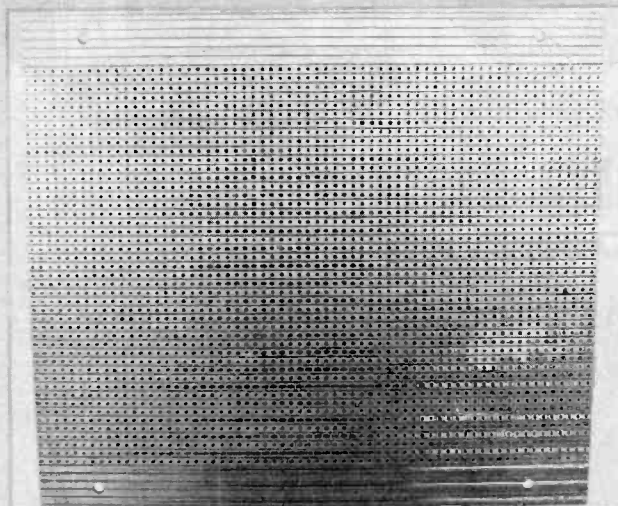


Fig. 3—Pierced Vero board with a 0.1" matrix in copper track permits IC assembly or any other type of circuit a technician needs. This type of board eliminates the need to fabricate a PC board of the type shown in Fig. 1.

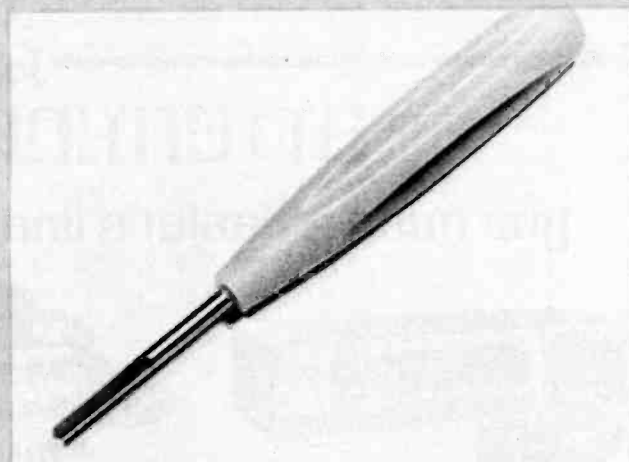


Fig. 4—A spot cutter sold by Vero for cutting the copper track to break the circuit.

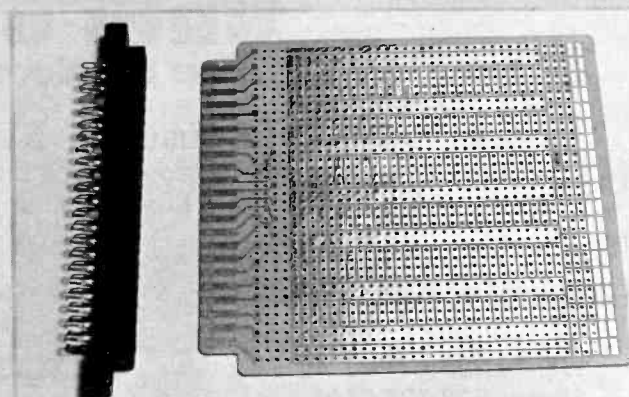


Fig. 5—Radio Shack OP Amp IC board and socket.

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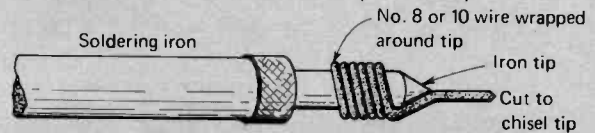


Fig. 6—Extending and narrowing the tip of the soldering iron with #8 or #10 wire permits soldering of very close copper areas.

copper foil. The first step is to remove the solder from the connection. There are two methods to do this. One is to use a product called Solder-Up or Wick-Up. This is a very flexible braided copper wick that is placed on the solder joint to be cleaned. The soldering iron is then placed on the copper wick for about one second. As the solder melts it is drawn into the wick which is removed, with the iron, after the one second. This process is repeated for each component connection and it may then be removed.

The second device is a squeezable rubber bulb with a teflon tip that suctions up the solder as it is melted. This is called a Vacu-Bulb.

Cleaning Printed Circuit Boards—After wiring a printed circuit board a residue of hardened flux covers portions of the copper foil. Before placing the board into an assembly, all flux and other foreign material should be removed by scrubbing the board with alcohol or a commercial spray made for this purpose.

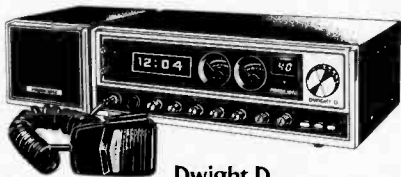
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Experiment #28—Zener Diode Regulator

In this experiment we will design a simple zener regulator circuit and plot its regulation characteristics. The power supply to be used has a DC output of 10 volts and the regulator circuit will provide an output of 6.2V at 12.4 mA maximum. The zener diode current will be set at 2 mA. To determine the value of R_s in Fig. 1 proceeds as follows:

$$R_s = \frac{V_{in} - V_o}{I_z + I_L}$$

$$= \frac{10 - 6.2}{2 \times 10^{-3} + 12.4 \times 10^{-3}}$$

$$= \frac{3.8}{14.4 \times 10^{-3}} = 263\Omega$$

$$W_{RS} = E_{RS} \times I_{RS}$$

$$= 3.8 \times 14.4 \times 10^{-3} = 0.055W$$

A $\frac{1}{4}$ or $\frac{1}{2}$ watt resistor may be used.

The maximum dissipation of the 6.2V zener diode will be

$$W_z = V_z \times I_{z \max}$$

$$= 6.2 \times 14.4 \times 10^{-3}$$

$$= 0.09W$$

We can safely use the 1W zener available.

Materials:

- 1—Chassis from Exp. #16
- 2—Diodes, 3A 200 piv Radio Shack #276-1143
- 1—Zener diode, 6.2V, 1W, Radio Shack #276-561
- 1—Capacitor, 1000 μ f, 50V, Radio Shack #272-1047
- 1—Resistor, 4.7K, $\frac{1}{2}$ W, Radio Shack #271-030
- 1—Resistor, 1K, $\frac{1}{2}$ W, Radio Shack #271-023
- 1—Resistor, 560 ohms, $\frac{1}{2}$ W, Radio Shack #271-020
- 2—Resistors, 270 ohms, $\frac{1}{2}$ W, Radio Shack #271-016
- 2—Resistors, 100 ohms, $\frac{1}{2}$ W, Radio Shack #271-012

Procedure:

- 1—Wire the circuit shown in Fig. 1.

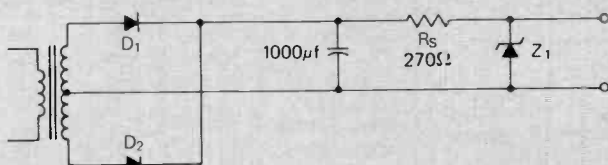


Fig. 1—Full wave power supply and zener regulator. Diode Z_1 is a 6.2 volt 1 watt device, Radio Shack #276-561.

- 2—Measure the no load voltage across the zener diode and enter it in Chart I.

R_L	I_L mA	V_o
Inf.	0	
1K	1.3	
560 Ω	11.1	
470 Ω	12.3	
370 Ω	14	
270 Ω	16.6	

Chart I— V_o versus I_L

- 3—Connect a 4.7K resistor across the output, measure the output voltage and enter the reading in Chart I.

- 4—Repeat the above procedure for the following resistance values, entering each reading in Chart I.

1K	370 Ω
560 Ω	270 Ω
470 Ω	

Note: The 470 ohm resistor is made up of a 270 in series with two 100's and the 370 is formed by removing a 100 ohm resistor.

- 5—Plot the output voltage versus the output current on the graph of Fig. 2.

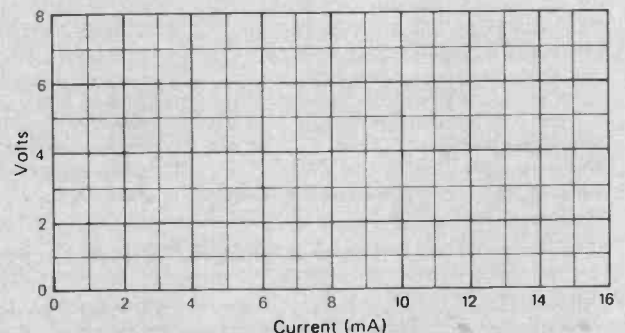


Fig. 2—Graph for plotting the regulation characteristics of the circuit shown in Fig. 1.

Note at what point the regulation broke. When the 470 ohm load was connected we approached I_{\max} and the regulation started to break. The two subsequent higher load currents broke the regulation.

BASIC RADIO (continued)

Zener Wattage Rating—One more point needs to be considered, W_z . As I_L decreases the current flow through the zener increases. If we remove the load completely, always a possibility, then *all* the current must flow through the zener. In the above illustration it will be 128 mA. The power dissipated will be

$$\begin{aligned} P_z &= V_z \times I_z \\ &= 5 \times 128 \times 10^{-3} \\ &= 0.64W \end{aligned}$$

A 1 Watt zener would be a suitable rating.

VR Tubes—Voltage regulator tubes consist of a plate (also called an anode) formed by a nickel wire, surrounded by a cylindrical cathode. The construction and VR tube symbol are shown in Fig. 8.32. Both the anode and cathode are placed in a glass enclosure that is filled with an inert gas at low pressure. The gas may be neon, argon, helium or a mixture of all three.

The VR tube operates on the principle of varying resistance. When a voltage is placed across the VR tube, the positive anode attracts electrons that have been freed from the gas atoms by light or radiation. Since there are few electrons a very small

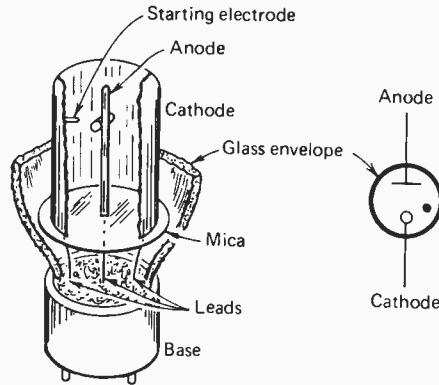


Fig. 8.32—Construction and circuit symbol of the VR tube. The dot in the circle indicates a gas filled envelope. The starting electrode attached to the cathode reduces the spacing between the cathode and anode at that one point to permit conduction to start at a lower voltage than would be possible without it.

current flows. As the voltage is increased and the velocity of the electrons increase, the electrons collide with gas atoms and break valence electrons free to join the electron flow. These electrons in turn strike other atoms to increase the ionization process until all the atoms are ionized. The positive ions are now drawn to the cathode which is negative. When the ions strike the cathode they heat the surface causing electron emission. Once the gas in the tube ionizes, the voltage across the

tube, and thus across the load, will remain at the ionizing level, the VR tube voltage.

The regulator circuit shown in Fig. 8.33(A) is similar to the zener circuit but operates at higher voltages and lower current loads. The typical VR tubes and their ratings are shown in Fig. 8.33(B).

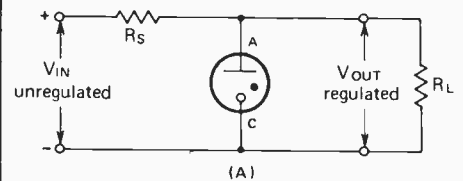
The current paths in the circuit of Fig. 8.33(A) are the same as in the zener circuit. Electrons leave the negative terminal of the voltage source, flow through VR and R_L , recombine and flow through R_S . Again, the current flow through R_S is the sum of I_{VR} and I_{RL} . To understand the regulating action consider what happens when I_{RL} , the load current, increases. The increase in I_{RL} will cause V_O to start to drop. As V_O drops the voltage across the VR tube also drops as they are in parallel. As the voltage across the VR tube drops ionization decreases within the tube, increasing the VR resistance. This lowers I_{VR} exactly the same amount the load current increased, causing I_{RS} to remain constant and V_O to hold steady.

The calculation for R_S in the VR tube circuit is slightly different than for the zener circuit. For the circuit in Fig. 8.33(A) we have an input voltage of 225 volts, a required output voltage of 150 volts and a load current drain of 55 mA. Examination of the chart in Fig. 8.33 shows the OD3 has a 150 volt drop across it with the following ratings:

$$\begin{aligned} \text{Voltage} &= 150V \\ I_{\min} &= 5 \text{ mA} \\ I_{\max} &= 40 \text{ mA} \end{aligned}$$

Regulator circuits using a VR tube should operate with the tube current midway between I_{\max} and I_{\min} , the mean current.

$$I_{\text{mean}} = \frac{I_{\max} + I_{\min}}{2}$$



Tube type	Tube voltage	Current ma		Minimum supply voltage
		Min.	Max.	
OA3-VR75	75	5	40	105
OB2	108	5	30	133
OB3-VR90	90	5	40	130
OC2	75	5	30	105
OC3-VR105	105	5	40	135
OD3-VR150	150	5	40	185

(B)

Fig. 8.33(A)—Basic VR tube regulator circuit is not unlike that used for the zener diode. (B)—Chart showing the characteristics of some VR tubes.

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$$I_{\text{mean}} = \frac{40 + 5}{2} = 22.5 \text{ mA}$$

To find the value of R_s the formula used is

$$R_s = \frac{V_{\text{in}} - V_o}{I_{\text{mean}} + I_{R_L}}$$

$$= \frac{225 - 150}{22.5 \times 10^{-3} + 55 \times 10^{-3}}$$

$$= \frac{75}{77.5 \times 10^{-3}} = 967.8 \Omega$$

Series Regulators—While the zener diode and VR tube regulator circuits work, they have several disadvantages. First, the output voltage is fixed. To change V_o we must change the zener or VR tube and then change R_s . Second, neither circuit is suitable for very high current loads because of the presence of R_s .

The above limitations could be solved if the *series resistance*, R_s , were made variable as shown in Fig. 8.34(A). As I_L increases R_s can be decreased and as I_L decreases R_s can be increased. Once again, the problem is to accomplish this adjustment automatically rather than manually. This can be done as shown in Fig. (B) of 8.34.

The block labelled *control circuit* contains a transistor or vacuum tube that will act as an adjustable series resistance. How this operates will be covered much later. The block marked *sample circuit* contains an amplifier (transistor or tube) and a voltage reference, usually a zener diode or VR tube. A portion of the output voltage is sampled across potentiometer R_{ADJ} , fed to the sampler stage and compared with the zener voltage. The resulting output voltage is fed to the control circuit where it sets the internal resistance of the transistor or tube. If the load current increases, V_o drops. The sampler circuit comparing V_o with the zener voltage, recognizes the change and shifts the voltage fed to the control circuit. This change in control voltage causes the control circuit resistance to lower, raising V_o to normal.

Some regulator circuits have variable or adjustable output voltages while others are fixed in output.

The vacuum tube series regulators are usually very large often using as many as 6 or 7 tubes. Regulator circuits using transistors are considerably smaller even though as many transistors may be used. There are, however, transistorized series regulator circuits that may be purchased *constructed* as shown in Fig. 8.34(C). All the required components, transistors, resistors and diodes are integrated into the one enclosure. More data on integrated circuits is given in an accompanying information sheet.

Filtering—A fringe benefit from all

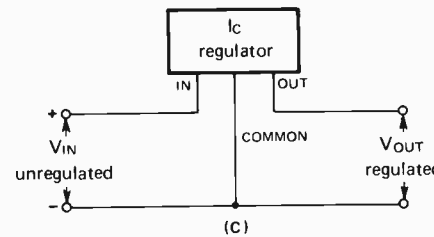
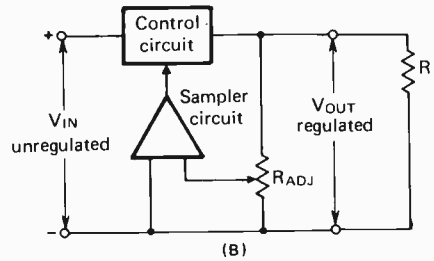
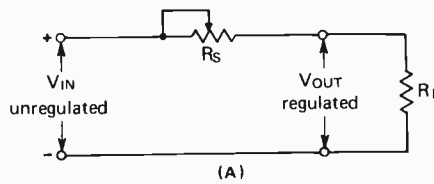


Fig. 8.34(A)—Basic series regulator circuit suitable only for manual adjustment. **(B)**—Block diagram of a series regulator. **(C)**—Block representation of an integrated circuit (IC) regulator that contains all the necessary components in a housing 3/8" x 3/8" square by 3/16" thick.

the regulator circuits, particularly the series regulator with the built-in amplifier circuits, is that they act as *filter circuits* as well as regulators. Consider the ripple voltage input to the regulator will correct and it is easier to see how the ripple is filtered. Many power supply circuits use the IC regulator in place of elaborate filters for they are frequently less expensive and considerably smaller.

Next month we will discuss batteries as a source of power, the construction of a heat control device for soldering irons and the construction of a permanent regulated power supply to be added to our test chassis for use in later experiments.

Self Check Questions

- 1—Most power sources have a tendency to drop their voltage output as the load current is increased. T or F.
- 2—A parallel regulator draws more current from the power supply to compensate for an increased load current drain. T or F.
- 3—A zener diode is a typical parallel regulator device. T or F.
- 4—When acting as a regulator, a zener diode operates in its breakdown area. T or F.
- 5—The voltage drop across a zener diode is constant over the entire breakdown area. T or F.

6—The sum of I_L and I_Z in a well regulated zener circuit will always be constant regardless of changes in I_L . T or F.

7—Calculate the value of R_s in Fig. 8.30(A) given $V_{\text{in}} = 25\text{V}$; $V_{\text{out}} = 12\text{V}$; $I_L = 5 \text{ mA}$; and $I_Z = 2 \text{ mA}$.

8—For problem #7 above, calculate the power dissipated by R_s and the power dissipated by the zener diode.

9—As the voltage drop across a VR tube increases, its internal resistance increases. T or F.

10—Using the data from the Table in Fig 8.33(B) calculate R_s for the circuit of (A) given the following; $V_{\text{in}} = 150\text{V}$; $V_{\text{out}} = 90\text{V}$; $I_L = 22 \text{ mA}$.

11—For high current loads the type of regulator most desirable is the

- A) Shunt zener
- B) Shunt VR
- C) Series
- D) None of the above

12—What is the effect, in Exp. #28, when the current drained from the zener regulator exceeds the maximum design current?

Self Check Answers

1—T
2—F—The parallel regulator will draw less current.
3—T
4—T
5—F—There is a small voltage variation over the current range of $I_{Z \text{ max}}$ to $I_{Z \text{ min}}$.
6—T
7— $R_s = \frac{V_{\text{in}} - V_o}{I_L + I_Z} = \frac{25 - 12}{22.5 \times 10^{-3} + 5 \times 10^{-3}} = 1.85\text{K}$
8— $P_{RS} = V_{RS} \times I_{RS} = 13 \times 7 \times 10^{-3} = 0.091\text{W}$
 $P_Z = V_Z \times I_{Z \text{ max}} = 12 \times 7 \times 10^{-3} = 0.084\text{W}$
9—F—As the voltage rises it increases the ionization thus lowering the internal resistance of the VR tube.
10— $R_s = \frac{V_{\text{in}} - V_{\text{out}}}{I_{\text{mean}} + I_L} = \frac{150 - 90}{22.5 \times 10^{-3} + 22 \times 10^{-3}} = 1348$
11—(C)
12—The regulation breaks and the output voltage drops below the zener value.

ANNOUNCING

A brand new magazine from the publishers of S9



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ANATOMY OF A SCANNER

BY GORDON WEST, KMX-8483

Part 13: Crystals



SCANNER crystals are one of the most important parts in setting up your scanner to receive police, fire, or emergency calls. Although the crystal seems such a simple item to purchase and plug into a scanner, there still seems to be a great deal of confusion about how these tiny frequency determining devices work, and why they must be purchased with extreme caution. We say "caution" because the bill can run fairly high on the purchase of ten UHF crystals, only to find out that they might be off frequency because you did not specify what type of scanner you had, and what type of crystal it takes.

Before we talk about scanners and crystal compatibility, let's take a look and see what actually is within that silver can and how scanner crystals are constructed.

If you are able to remove the silver can you would first hear an exchange of air and dry nitrogen gas that is contained within the crystal can. Because we are looking at the anatomy of a crystal, we won't worry about that! What you'll find is a wafer thin round crystal suspended by two metal plates on either side of the thin crystal membrane. That thin piece of crystal vibrates at a precise frequency when the

two metal plates are energized, and it's a multiple of that exact vibrating frequency that ultimately determines what channel your scanner is going to monitor. Needless to say, the construction of that wafer thin crystal element must be precise.

The first process in making up the scanner crystal is to cut man-made "cultured" crystal bars into thin sections called "crystal blanks." These are ultra-thin, and are generally twice as small as a dime. The crystal blanks are cut from the cultured crystal bar in such a way that they resist frequency change when temperatures rise or fall. The cutting of the blank is critical, and tremendously expensive pieces of equipment must accomplish the task. Once the blanks are cut into small round circles, they are precisely rounded and molded to a pre-determined diameter.

Pre-cut crystal blanks are available from many manufacturers to many crystal facilities that will etch and bevel the crystal blank to its precise requirements. This critical operation sometimes takes up to a week to insure that the crystal is precisely identical to other ones destined to be "tuned" to an exact scanner operating frequency. Once the finished crystal blanks are removed from the "tumblers" that automatically bevel them, they are then cleansed ultrasonically to insure they are not contaminated with pieces of loose crystal still adhering to their wafer thin centers or edges. After the ultrasonic cleaning, the crystals are then only handled by tweezers.

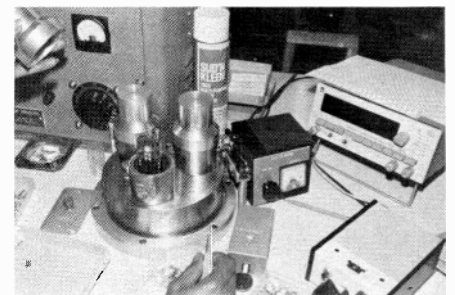
The next process is to plate each side of the crystal with a silver electrode. After this process, a fine silver spring-like wire is attached to each side of the crystal blank, and mounted onto the crystal base—the part that you can recognize as two pins that fit into the crystal sockets on your scanner. Each one of those pins contacts the silver plated crystal.

The next step in the production of a scanner crystal is to "net" electronically the crystal to the exact frequency that will ultimately be a multiple of the channel you wish to monitor on your scanner set. The exact frequency

is carefully obtained by a silver plating process in a vacuum while the oscillating crystal blank is being monitored on a frequency counter. When the precise frequency is reached, the silver plating process is stopped, and the crystal—still exposed to the elements when removed from the vacuum chamber—is now ready to be "canned."

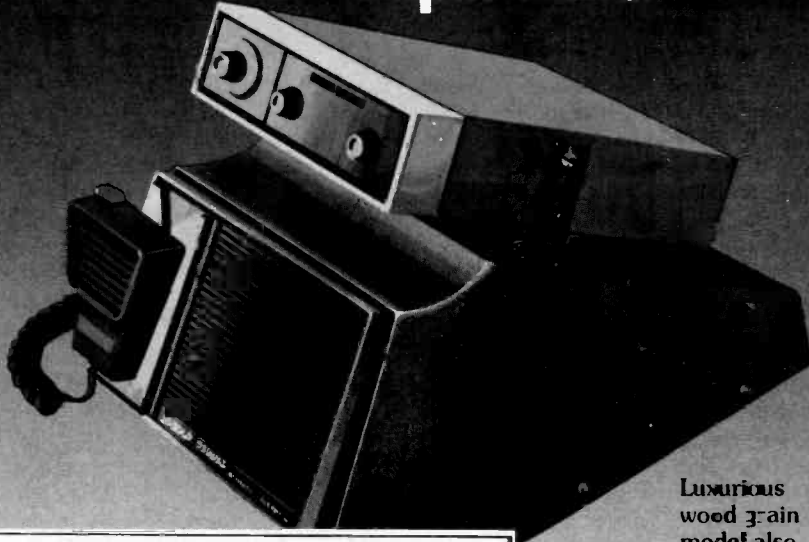
Since air with all its impurities could easily affect the frequency of the crystal, it needs to be "canned" in a different atmosphere—the best is dry nitrogen. To do this, the can is first placed over the exposed crystal and soldered to the crystal base by melting solder in the crystal base moat that the can will fit into. A tiny hole in the can is going to be the exit hole for our normal air, and through that hole in a nitrogen chamber will pass the proper amount of nitrogen to keep the crystal "pure." Inside the nitrogen chamber, all the air is evacuated and the dry nitrogen rushes in, and the hole is manually soldered closed. Take a look at a monitor crystal lengthwise and you will see the small solder spot where it closes up the hole.

After this process, the crystal is then retested to insure it has no leaks, and the frequency is then measured under varied temperatures. If everything checks out properly, and the frequency is within critical tolerances, the crystal is now either stamped with its operating frequency or sometimes the frequency is etched in ink on the side of the crystal. The frequency for scanner receivers that appears on the crystal is the frequency that you wish to monitor. However, the actual vibrating frequency of the crystal is many times less than the actual scanner operating frequency—



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Patents Applied For

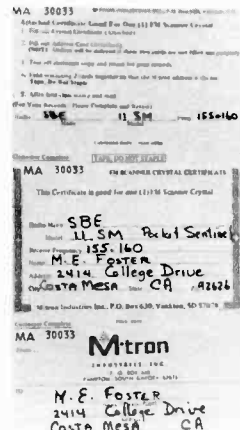


the frequency is multiplied electronically within your scanner. Only in rare instances would you find the crystal basic operating frequency printed on the side of the crystal.

On the scanner scene, crystals may rarely be interchanged between scanner manufacturers. Take for instance the Regency crystal—it won't fit a Bearcat scanner. Nor will the Bearcat crystal work in a Regency scanner. Then comes along fifteen other manufacturers and only three of those fifteen manufacturers use the same exact crystal. Not only are the frequency multiples different, but also the crystal capacitance. Although you might think that the conversion frequency of the crystals may be the same, the difference between 32 pf and 64 pf may swing your scanner off the desired frequency. Unfortunately, like microphone connectors, scanner manufacturers have not "standardized" on a common crystal that will fit all crystal scanners.

It's recommended that you purchase your scanner crystals at the same place you purchase your scanner. Generally if they carry Regency and Bearcat scanners, they'll carry both Regency and Bearcat crystals. If for some reason the crystal of your choice on a certain operating frequency is not in stock, many retail outlets have "crystal coupons" that may be sent to the manufacturer of that particular type of crystal that will immediately redeem the coupon for a crystal that will work on your particular scanner.

Since crystals are expensive, both on the wholesale as well as retail level, few scanner specialty shops have every single frequency in stock—they gener-

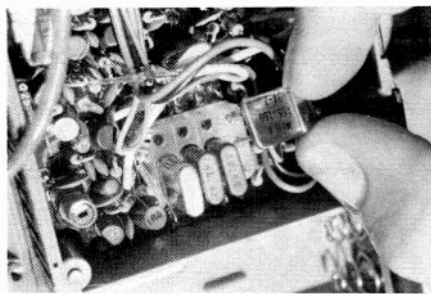
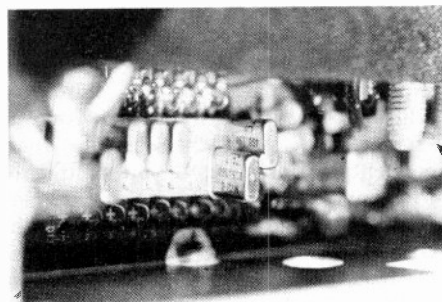


ally carry only the popular ones. If you have a particular ambulance service or tow truck service you wish to monitor, they might not have that particular crystal in stock. Chances are they would have all of the police, fire, sheriff, and state patrol frequencies on hand—but for those oddball channels, you might have to wait a few weeks.

If you do have to order your crystals through "crystal coupons," don't worry—the manufacturers of those crystals and crystal coupons know exactly how to build the crystals to fit your particular type of scanner. However, you must give all the information on the coupon as requested. Simply by filling out the crystal coupon and stating that you have a SBE scanner won't do the trick—there might be three different crystals for several different model SBE scanner receivers. Be sure and write down all of the details, such as the make of your radio, the model number, the frequency you wish to receive in MHz, and of course your name and address. Crystal manufacturers do not keep listings of police department frequencies, so be sure and specify the actual frequency you wish to monitor. If you state "Seal's Ambulance Service" after the word "received frequency desired," chances are they'll return the coupon and ask for the actual operating frequency.

One innovative scanner manufacturer—Electra Company who manufactures the popular Bearcat scanners—offer a frequency finding service simply by dialing the toll free number 1-800-428-2326. (Indiana 1-800-382-2072). Just ask for Betty Bearcat, and she will cheerfully look up the frequency of the service you wish to monitor. If you state "Seal's Ambulance Service" in Costa Mesa, California, she'll flip through her book and tell you that the frequency is 155.160 MHz. Then all you have to do is to send away on the crystal coupon for that exact crystal.

It's important that you only order crystals through well known crystal manufacturers in the scanner monitor business. Crystal tolerances are critical when it comes to low band and high band crystals. Crystal tolerances when it comes to UHF reception are *ultra critical*—remembering that the frequency is multiplied about three times



as much from the actual operating frequency of the crystal for UHF reception. If the frequency is just a few cycles off as it basically oscillates, it will be sometimes up to a hundred or sometimes thousand cycles after it is multiplied electronically within your scanner receiver. If you have trouble in hearing UHF frequencies "on frequency," chances are you're buying your crystals from a manufacturer who is not used to manufacturing precision UHF scanner monitor crystals.

Unfortunately to keep the cost down, most scanner manufacturers do not provide "trimmers" in their scanner sets for netting off frequency crystals on the exact operating channel. In more expensive land mobile and amateur radio VHF transceivers, each crystal position has a small capacitor that may be tuned one direction or the other to "swamp" the crystal onto the desired frequency. If you have a crystal that is slightly off frequency on your scanner, you're simply out of luck. There's no way of "netting" it on frequency unless you are the proud owner of about 1 percent of the scanners that feature this "netting" function.

Once you take the scanner home, it's generally up to you to install any future crystals. Most scanner retail outlets will be nice enough to install the original crystals for you—be sure and pay attention on how they go in. There is no polarity when it comes to a crystal—it makes no difference as to which way the pins go in. However, on dual and tri band scanners, make sure and put the UHF crystals in UHF sockets, and VHF crystals in VHF sockets. Sometimes dual band scanners share crystal sockets, and it will be up to you to install the crystals properly.

Avoid using long nosed pliers in installing crystals—it's quite easy to bend the can inward and cause it to short out the plating on one side of the crystal blank. Always try to install the crystal using only your fingers, and treat them carefully. If a crystal is dropped onto a hard floor or cement walkway, there is the likelihood that the crystal may dislodge itself within the can, and fracture. If you shake a crystal and hear something rattling in it, you probably are out of luck with that crystal.

Some other points to remember

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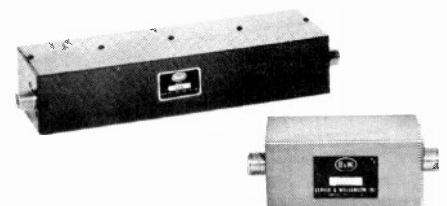
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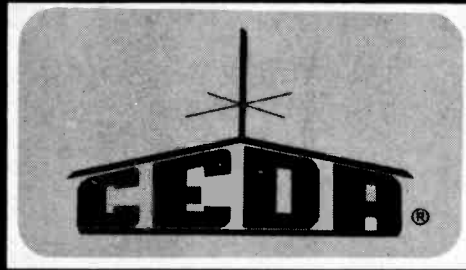
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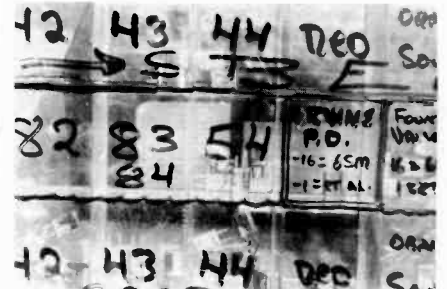
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about crystals is that the frequency, if not stamped on the crystal mechanically may sometimes be rubbed off by handling the crystal too much. Make sure and keep loose crystals in envelopes with the frequency marked on the envelope. There is no easy way of testing a crystal to find out what its actual operating frequency is—even at the retail facility where you bought the crystal. It takes precise frequency measuring devices to check the crystal's actual operating frequency, and to find out how "active" the crystal is—whether or not it will operate satisfactorily in your unit.

There is nothing you can do with a volt/ohm meter to check a crystal—and sometimes, by measuring the two pins with an ohm meter you can physically damage the quartz within the can.

Probably the biggest question among scanner enthusiasts is which type of crystal will fit which monitor. Unfortunately, only a few crystal manufacturers have this data and are reluctant to publish it. However, as a guess, out of 25 different manufactured scanners, only five of them use the exact same crystal! There are no adapters that will make a crystal be "universal" for any type of scanner.



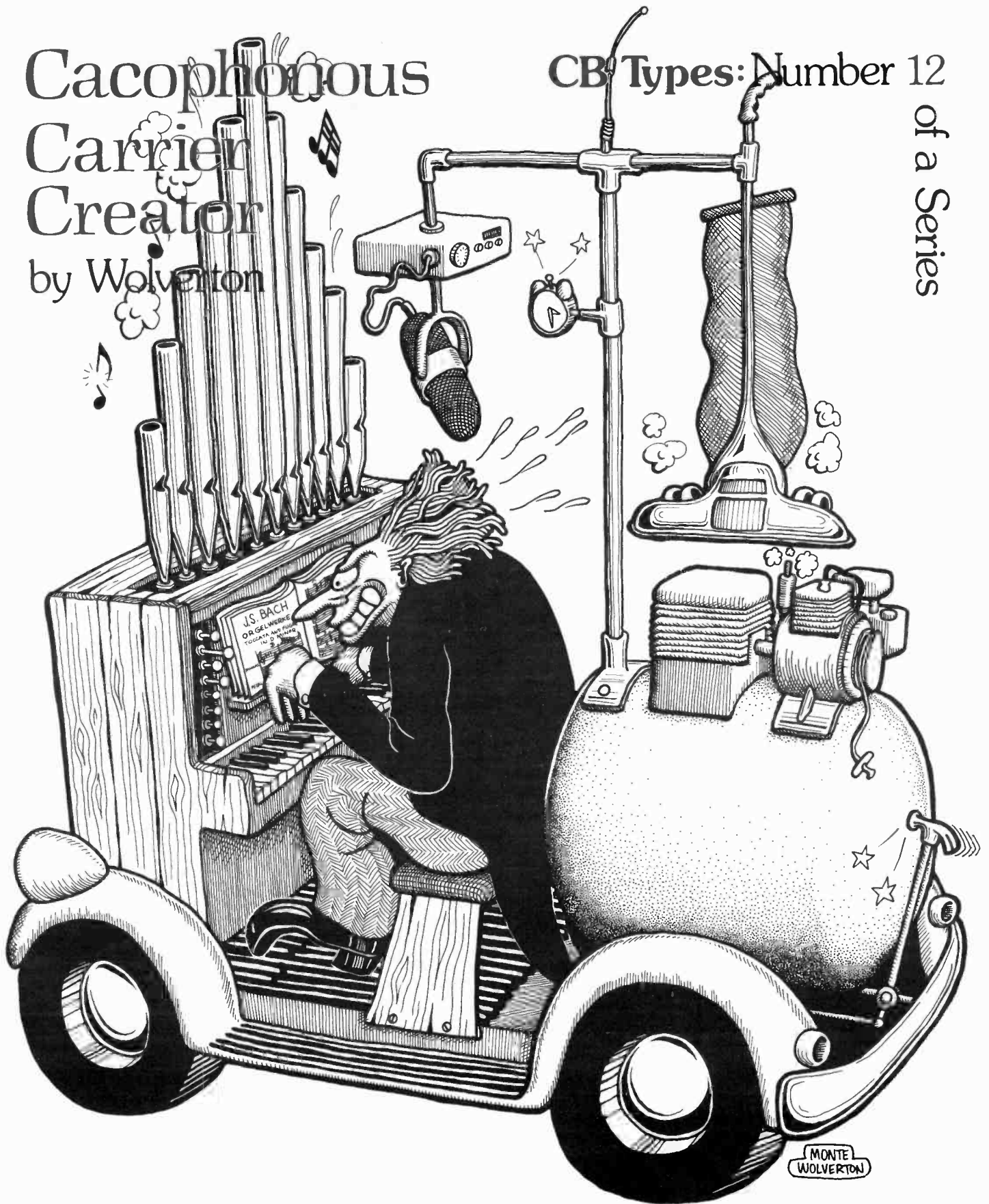
As you can see, that tiny quartz crystal is a precision instrument that can easily lead to on-frequency or off-frequency monitoring. Buy only the best in crystals when you seek new frequencies to monitor. Bargain crystals seldom achieve precise frequency settings. However, a very old crystal found to be from a reputable manufacturer will perform flawlessly for many years to come—precision, well made crystals seldom wear out. Although they may look brown and dirty, within the inside, they'll faithfully generate the exact frequency you wish to monitor.

It will probably be five more years before phase-lock-loop circuitry antiquates the crystal scanner—and some experts feel that even PLL circuitry will still be slightly more expensive in "synthesized" scanner receivers than conventional crystals. If you want only to monitor a few frequencies—and not want to program every frequency in the world—then stick with a crystal scanner, and choose high quality crystals for precise frequency monitoring.

Cacophonous Carrier Creator

by Wolverton

CB Types: Number 12
of a Series



Some people on the channels enjoy constantly bombarding everybody else with bizarre noises, music and other obnoxious material. Here we see such a person happily operating a machine built just for him. Features include out-of-tune pipe organ, supplied with air from loud, gasoline-powered compressor. Percussion is provided by vacuum cleaner, alarm clock, and hammer on compressed air tank. Unit is propelled by other CB'ers kicking it out of town.

HAM SCAM Getting Your License

THE HAMS VERSUS THE CB'ERS

BY GEORGE McCARTHY, KAAK4218/W6SUN

INTRODUCING a column designed to familiarize the CBer with the world of Ham radio. In addition to information on how to study the code and how to pass the written examinations for various levels of operating licenses, there will be wide ranging discussions of all aspects of the hobby. Code, phone, teletype, repeaters, HF, VHF, UHF, phone patching, message handling, net operation, DXing, autopatch, AM, FM and Sideband—all will be covered in detail, but in the kind of informal format that makes for easy and enjoyable reading—regardless of the complexity of the subject. Readers are encouraged to write and ask about any phase of special interest to them.

Now we'd like you to meet CHARLIE CBer. He's going to ask just about any kind of question that pops into his fertile mind. And he's not going to be put off with incomplete or evasive answers. Charlie is a typical CBer. He wants answers to his questions about Ham radio. He's heard enough mumbo jumbo already. Now he wants the *straight* scoop. If he's hearing personal opinion, fine, but he wants it labeled as such—not put forward as if it's the last word on the subject.

And here's HERBIE HAM. He's been in the radio amateur business since Charlie was in rompers. He's been through most of the developments from the time he was building his own receivers and transmitters. He has held the amateur EXTRA class ticket for years. Herb knows his way around the ham bands from top to bottom. After more than forty years in the hobby he has yet to lose his enthusiasm. We think that you'll be able to see that for yourselves as he fields Charlie's questions each month.

All right, Charlie, this is Herb, he's all yours.

Charlie Why should I be interested in Ham radio anyway?

Herb Hey, you may or may not be interested. I'm not shoving it down your throat, but it sure seems like a logical *extension* of CB radio for some of the people who got turned on by the idea of personal radio communication.

Charlie I hear that Hams think that they're several notches above the CBer. Is that right?

Herb I can't speak for *all* Hams, and I'm sure there are many Hams who feel that they had to go through a lot more strain to get their tickets, so they value them pretty highly. It's just human nature to put a value on things by the degree to which they were difficult or costly to obtain.



Charlie You mean they think that the CBers are getting a free ride?

Herb That's too harsh a judgment. You know as well as I do that getting a CB license is a *piece of cake*. That's not true for a Ham license. I guess that it's kind of natural for those who have gone the FCC exam route for an amateur radio license to feel that they've accomplished something that's worthy of recognition. Maybe that's why some of them aren't too graceful when they are confused with CBers by someone.

Charlie "Aren't too graceful!" That's an understatement. I've heard some of them go into a tailspin about being taken for a CBer.

Herb I'd bet that you have no idea how many Hams there are on the CB band right now.

Charlie You think that there are a lot?

Herb Thousands of them!

Charlie Then why don't they identify themselves as such?

Herb Number of reasons. Maybe they're using Ham equipment that they've modified for use on the 11 meter CB band. That's illegal and they know it. Then too, they might *like* having two separate and distinct radio lives—two personalities. Or they may just feel a little funny about admitting that they are on CB by their own choice.

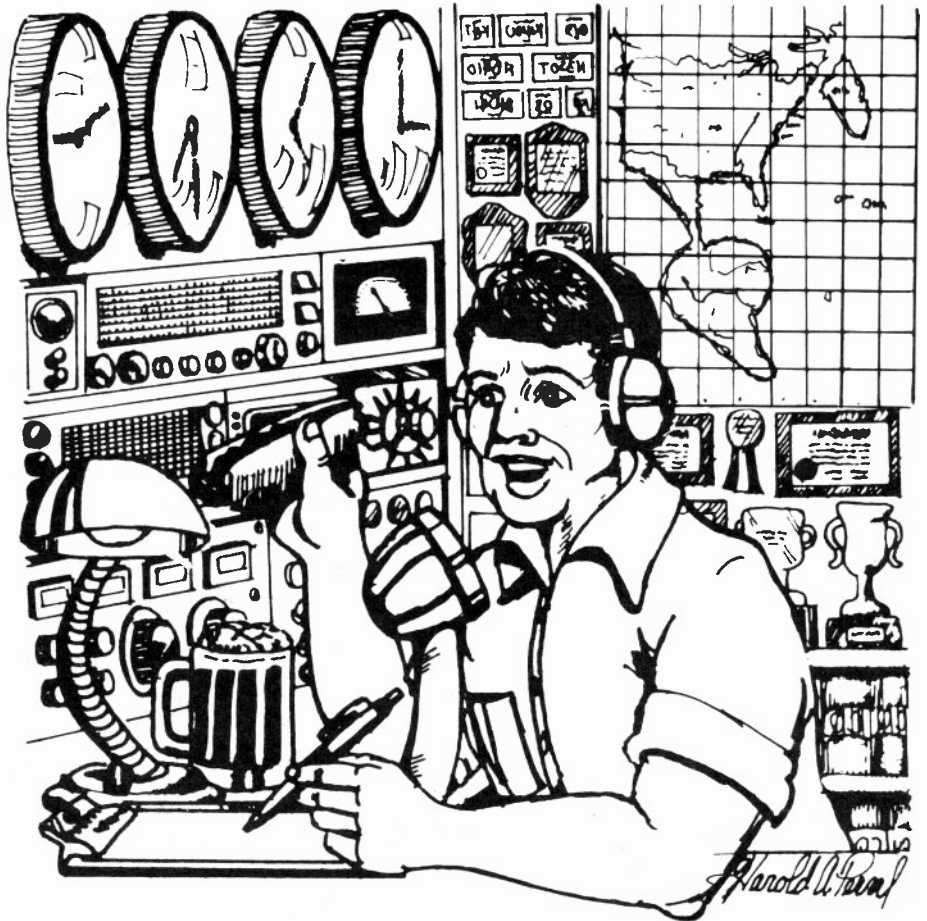
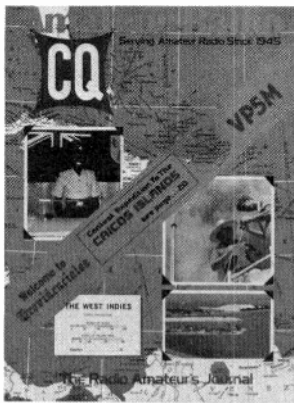
Charlie Why in heck would a Ham want to be on CB anyway?

Herb Now we're getting to the heart of the question! It's one thing I really would like to talk about.

(continued)

Interested in Ham Radio?

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- Charlie So, talk!
- Herb CB and Ham radio are COMPLIMENTARY. They blend together and there shouldn't be any reason for much of the antagonism that now exists. Usually hatred or dislike is based on ignorance. Right now the failure is on *both* sides—Ham and CBer. Ham radio offers something different from CB radio. It's more technical, wider ranging, has more facets, more possibilities, and along the way, it has more frequencies. But it frequently lacks the personal touch of CB radio. It rarely includes the entire family. Except for some local Ham clubs, it can actually be a hobby for a "loner." Hams don't often get together to do other things, like breaks, jamborees and meetings. Oh sure, there are *some* meetings for the specialized areas of Ham radio, but not nearly on the scale of the typical CBer.
- Charlie So what makes them "complimentary?"
- Herb The fact that one person can enjoy the best parts of both! The really well rounded communicator may have a Ham station which he uses to talk with the rest of the world (legally) and a CB station which he uses to keep in touch with his local buddies. So, it's the best of both worlds—if people on each side would only wake up and realize it!
- Charlie Do you practice what you preach?
- Herb You bet your power mike I do! I belong to a CB club and have met more people in the last year than I had in *ten* years before that. Sure, my wall is covered with Ham QSL cards from 250 different countries, but I had missed the *personal* contact that only CB radio provided me.
- Charlie Do you encourage the CB'ers you know to go into Ham radio?
- Herb Of course I do! Listen, I'm an avid Ham radio operator. I love the hobby. It's been a large part of my life for longer than you've been alive. I want others to share in the excitement, the fun and the service aspects. It has something to offer everyone. It is the logical extension for the *serious* CB'er to make.
- Charlie What's that supposed to mean, the "serious CBer?"
- Herb I think that what I'm trying to say is that lots of folks get a CB radio—use it to shout their family and friends—and are willing to let it go at that. Just how it works—its possible range—how the station can be improved—is not of interest to them.
- Charlie And the other type is a lot different?
- Herb You'd better believe it, Charlie! Maybe they started out as *just another* hobby to have—a new experience. In a while the real kick of being able to communicate with others via two-way radio got a grip on them—they're hooked! It is UNIQUE and it is FUN! And most people who have their interest tuned up like to know more about what they're doing—like to *upgrade their capabilities*.
- Charlie So they buy *CB RADIO/S9 Magazine* and more equipment?
- Herb Righto! Next thing you know that first set and the simple ground plane antenna no longer cut it for them. They realize that they need *more station* if they are going to take fullest advantage of the channels! They want to upgrade their equipment. They ask *a lot* of questions and they start reading articles. Soon they have an elaborate station and antenna system.
- Charlie And P.S., next thing ya' know they're shooting illegal skip too, right?
- Herb Hey, that's almost impossible to resist. It's *out there*, buddy, and when it really starts to roll in, it takes more will power than most of us have not to give it a try now and then.
- Charlie You mean an old time Ham like you has "shot skip" on the CB band?
- Herb Err, you have me blushing. It's like I just *couldn't resist* seeing if my signal could "make the trip" better than the guy down the street was doing. Made me kinda nervous though. I'd hate to blow my Ham ticket if *Uncle Charlie* caught me talking over 150 miles on CB!
- Charlie Guess that would be kind of embarrassing, huh?
- Herb *To say the least!* Like, what kind of an excuse could I give? Wow, just the *thought* of being busted for skip shooting on CB is enough to give me the "willies."
- Charlie Then you don't do it often?
- Herb Nope! Just did it once or twice to prove that I could. Now I've got it out of my system and confine my CB contacts to the local crowd.
- Charlie Ah yes, there's nothing worse than a reformed sinner!
- Herb Don't rub it in, friend, I'm just glad I didn't get caught! But you see now that we've already touched on an area that many CB'ers have in common with Hams—the desire to shoot skip—work DX—the *longer* the better.
- Charlie You know—you're right! I do get a kick out of yakking with a guy or gal a long way off and exchanging "wall paper" with them. It doesn't make sense to limit us to 150 miles.
- Herb That's a majority opinion, Charlie, but right now it's the rule. So, if you like to work DX, the door to Ham radio is open to you. C'mon through and the world will be at your finger tips—and you won't have to worry about that sinister knock on your front door. (*cont'd*)

- Charlie Well, that's *one* part that does interest me, but why in heck do I have to learn that stupid code just to get a Ham license? Is it really still in use?
- Herb Charlie, that question has been asked by thousands of would-be Hams for dozens of years. Yes, it *still* is in use throughout the world. It is *still* the *most* reliable means of communication in emergencies. Every ship that sails the high seas commercially must have a radio operator and equipment that will provide for code communication on the international distress frequency.
- Charlie But what's that got to do with Hams? They don't operate on those frequencies, right?
- Herb Right. But you can't ever be sure just *what* frequency might be used by someone in distress. Just suppose that you were having a long-winded conversation with another Ham on 'phone. A code (CW) distress signal pops through on your frequency, but *you* don't clear the frequency for the emergency message because you don't know the code, so *you* don't know what's going on.
- Charlie I guess that's *one* case in which a person ought to know the code, but the chances of it happening must be one in a million.
- Herb That's probably true, but I'd hate to think that the local fireman hadn't bothered to learn artificial resuscitation on the theory that he might never have to use it since he mostly puts out fires!
- Charlie But they require a knowledge of the code even for getting a license to work only the VHF frequencies where code is hardly ever used. Explain that.
- Herb I can't rationalize *every* reason. I rather suspect that to some extent the code test is used as part of the selection process for the Ham license.
- Charlie You mean as a *DELIBERATE HURDLE* that a person will have to sweat through to get a Ham license?
- Herb *Yup!* Like *so* many things in life, if it didn't already exist, *someone* would have to invent it to serve the purpose. Guess the code is really a "hangover" from the "good old days" of radio. Like, it fits the "grandfather syndrome"—you know, "we had to learn it, so why should the next guy be let off the hook."
- Charlie *Now*, at last, I've *finally* got you where it counts! You've been cornered into admitting something I've suspected all along! *You* old time operators are the ones who want to keep the code test in—*just* to keep us newcomers out and hog the Ham bands to yourselves!
- Herb Not true, Charlie! Let me tell you something funny. Would you believe that the ones who make the *most* noise about keeping the code requirement are those who *just* got their licenses?
- Charlie You're kidding!
- Herb No, I'm not. In fact, ask most CB'ers who knuckled down and got their Ham tickets! They're *very* vocal in their opposition to making the test easier!
- Charlie On what basis?
- Herb On the basis that nobody made it easy for *them!* They had to WORK to get that ticket. They are very proud of what they've just done—and they have a right to be. Maybe it wasn't an easy row to hoe. But *they* did it. And now they *suddenly* see a great value of making it just tough enough to require a person have a genuine desire to have a Ham ticket! So, it's the *new* Hams who don't want that small hurdle dropped after they've just worked to clear it. Anyway, with the new "comprehensive" code test it's even easier than it used to be.
- Charlie Come again? It's *easier*?
- Herb Yup, and next month we'll dig into that code bit. Let me leave you with a thought. The Ham bands have always been policed by the Hams themselves. The FCC has long realized that it is a "self-regulating" hobby. The major reason for this is that almost all Hams *really* CARE about what goes on. They feel directly affected by the poor operating habits of ANY Ham. This "caring" is a direct result of the fact that some degree of *effort* went into getting their Ham license. My only concern is not what kind of test the FCC may give, but that the results of *any* kind of screening program will be new Hams that *CARE*, who *VALUE* their license, and who will do *everything* in were passed on by those who came before us. their power to hang onto high standards that Would *you* want less?



Merry
Christmas

CB CHALLENGE GOES SOUR

By Marian A. Harrington

THE famed CB talk-a-thons which originated in Oneonta, N.Y., may ultimately include challengers throughout the United States. Such endurance events are not without an element of risk as the following story will illustrate.

Tim (Fiddler) Ferguson attracted little attention on June 17, 1977, when Ed (Happy Hippie) Malecki and Alan (Son of a Bear) Nolan of Oneonta, N.Y. decided to better their own talk-a-thon record to win a place in the *Guinness Book of World Records*. While Ed and Alan logged 54 hours and 46 minutes of CB time, Tim, an avid CBer, monitored the event for 48 continuous hours to prove to himself that he had what it would take to challenge the record.

It was difficult to find a partner but his search ended when his aunt, Bertha (Prosser Hollow Sweet Pea) Goss agreed to participate in the endurance event scheduled for Friday, the 26th of August at 5 A.M.

Aside from observing FCC regulations and the *Guinness* requirements (corroboration in the forms of a local or national newspaper cutting and signed log books to show unremitting surveillance by adult witnesses), the CB talk-a-thons, thus far, seem to reflect the ingenuity of those involved. Sweet Pea and Fiddler

made posters to advertise the occasion, and placed them in several area stores. "Keep us talking on channels 7, 1, 20, and 22," the signs implored.

Another innovation, were the guest books placed conveniently in their homes for friends to sign; friends whose voices, in many instances, were more familiar than their faces.

According to Bertha (Sweet Pea), she and her partner hoped to modulate for at least 60 hours; six hours past the record set by Nolan and Malecki. They felt it would give them a comfortable lead.

On Thursday, with secretaries appointed to keep the logs, quick energy foods such as honey and chocolate bars on hand, and most importantly, an allowance for plenty of sleep, the contenders tried to anticipate their needs as loyal fans began calling in assurances of support. Still, no one except those being challenged, could fully comprehend the physical stamina and mental discipline required for this gruelling effort.

Sweet Pea and Fiddler who live on Prosser Hollow Hill, (and *hill* is an understatement), tell visitors, "This is the closest to heaven you may ever get."

Through the magic of their CB sets, they have brought many unseen friends into their isolated hill-top homes. Six of their CB buddies were waiting at 5

Bertha (Sweet Pea) Goss, the first of the fairer sex to participate in a CB talk-a-thon. Photo by John A. Harrington.



A.M. on August 26th, for the beginning of the talk-a-thon. By early afternoon, a record 109 answered the hourly roll call.

"How about ya, Thunderbird? Hey, you got the Sweet Pea," and so it went.

Approximately 29½ hours into the talk-a-thon, Tim (Fiddler) Ferguson was rushed to the hospital with chest pains. The word passed quickly through the CB community as everyone anxiously monitored channel 19 for news of his condition.

Tim's grandmother, who was with him when he collapsed, said, "He turned deathly white and staggered when he tried to walk. He had chest pains all through the night but didn't tell anybody."

The doctor in the emergency room at Fox Memorial

Hospital in Oneonta, diagnosed Tim's condition as nervous exhaustion. He was given a sedative and advised to rest for 24 hours.

For a time, thoughts about breaking the CB talk-a-thon record were secondary to the concern about the health of a goodbuddy. Fiddler wants to try it again, and others will make the attempt because records are made to be broken. But Fiddler's experience suggests that future challengers should consider a physical examination prior to a competition.

The *Guinness Book of World Records* makes the following statement: "Organizers of marathon events would be well counselled to seek medical advice before and surveillance during marathons which involve extended periods with little or no sleep."



Tim (Fiddler) Ferguson found that the Cobra 135 punches through loud and clear. Photo by John A. Harrington.

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CB wallpaper (maybe you call 'em QSL Cards) are pretty far down the road from where they were a few years back! They're today's newest art form, the folk art of the 1970's! Not that long ago they were really flat—now they're fluffy! Cards arrive at our offices which are truly representative of the creative expression of CB'ers from all states and from several nations.

You think they're *not* works of art? In our book, something that is creative and nice to look at and which is intended for being displayed on a wall, qualifies as art! And that's CB wallpaper!

So we thought it might be nice to run a contest to acknowledge this folk-art form, offer the creative geniuses behind some of these masterpieces their due recognition along with some prizes.

That's where you, our readers, come in—because we want you to send us your cards, that's right—maybe you'll carry off one of the prizes in triumph, be heralded as a creative genius in the pages of a forthcoming issue of CB RADIO/S9, the world's leading CB publication! And it's easy to enter—doesn't cost anything; you've got no excuses for not getting in on this!

What we'll be judging cards on is (not in the following order) originality, aptness, attractiveness, quality.

First prize will be \$100.00, PLUS half of all of the cards we received as contest entries—and that card collection alone should be enough to turn on any CB'er! Second prize will be \$50.00 and the remaining half of the contest cards we received!

Third prize is \$25.00; we will also have 3 runner-up prizes of 1 year subscriptions (or subscription extensions for existing subscribers) to CB RADIO/S9! (The winning cards will not be included in those cards we send out as part of the prizes, they will be retained in our files.)

GENERAL RULES

1. All entries shall consist of cards *no* larger than 9 inches by 4 inches, and may be printed or hand produced.

2. Entrants may submit more than 1 entry, however each separate entry should contain the name and mailing address of the entrant (may be typed or printed clearly by hand on the reverse of the card if necessary).

3. Cards submitted should be sent in to us enclosed in an envelope.

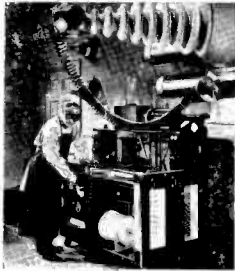
4. All entries must be postmarked between November 5 and December 31, 1977.

5. Cards submitted must be primarily concerned with CB operation (as opposed to cards primarily intended for Ham radio or SWL use).

6. All entries become the sole property of Cowan Publishing Corp., and will not be acknowledged or returned. Winners will be notified by mail and also announced (and their cards printed) in the April, 1978, issue.

7. Cards will be judged by the staff of CB RADIO/S9. The decision of the judges will be final.

8. Excluded from this contest are all employees of the Cowan Publishing Corp. and their families.



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This contest is void in any areas where it may be prohibited.

9. Optionally, entrants may include with their entry(ies) a self-addressed stamped return envelope. This will be used to return to the entrant some wallpaper from members of the staff of CB RADIO/S9.

10. All entries should be addressed to:
BODACIOUS QSL CONTEST,
CB RADIO/S9 MAGAZINE,
14 VANDERVENTER AVE.,
PORT WASHINGTON, N.Y. 11050

So, c'mon and get with it—it should *really* be a ball, and 100 *greenstamps* might well be yours to boot! Hustle on down to that mailbox and give us a chance to eyeball that *wallpaper* you're so proud of! And, if you notice Rule #9, if you send along a self-addressed stamped envelope with your entry, you'll get back one of TOMCAT's *new* QSL's—and (while we still have a few kicking around) one of TOMCAT'S ancient vintage collectors' 1964 cards). Maybe we can also come up with another card or 2 from S9 staffers too!

Let's go!

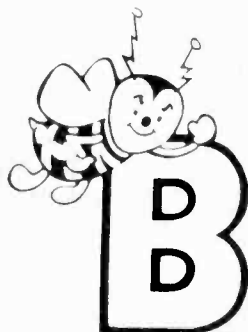


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TOMCATTIN' WITH TOMCAT!

ACROSS THE CHANNELS WITH S9'S EDITOR
TOM KNEITEL, TOMCAT/KE Z5173



CHANGING TUNE: My friend, MIRACLE MAN, sends some comforting news from south of the border, down Mexico way. Not too long ago the Mexican government was *most* hostile to American tourists who attempted to enter the country with CB rigs installed in their mobiles—rumor was that they were afraid that the rigs (which were not available for legal use by Mexican citizens) might fall into the hands of bandits or (even worse) revolutionaries. Apparently this curious ban cut into the tourist trade and now the people in charge of tourism have swung in the other direction and determined that they are going to establish quick and easy methods to permit the tourist use of CB rigs in Mexico. They also are setting up 3 channels for tourist CB's, one for intercommunication between tourists, another for use by caravans of several tourist vehicles, and the third for communication with "Tourist Assistance Patrol" base stations. . . .

SPEEDY ACTION DEPT.: In the August 1976 issue of CB RADIO/S9 (page 79) I complained that unless Uncle Charlie took a closer look at how the programs going out over their (licensed) TV stations were presenting the *misuse* of CB radio, they really had no squawk about the misconceptions which the public was getting about the service. I suggested that they sit on the tails of the TV networks and get them to present CB in a more appropriate manner. It took *only* a year for Uncle Charlie to get the wheels in motion on this project! The FCC has recently notified the broadcasters that they're going to have to present CB in a more responsible manner and stop promoting its improper use within the scripts of the programs. Of course, TV networks and the stars of their programs have tried to milk as much publicity as possible out of CB radio since it seems to titillate the public—quite often we here at CB RADIO/S9 are approached by TV network or actor's publicity reps with the hope that we will tell our readers about

how their programs or stars are *really* into CB radio and how they sit around their \$850,000 pads in Bel Air or Brentwood just *ratchet jawin'* like mad with all of the *goodbuddies* in CB land. While there actually are some people in the entertainment field active in CB radio, 95% of the stars you see *holding-the-CB-mike* in photo layouts are *not* active CB'ers, regardless of descriptions of their CB'ing interest. I recently saw a CB story about how star Robert Wagner is a *gung-ho* CB'er, only to notice that on one of his recent TV programs, *Switch*, he was not only using CB radio without announcing any call letters, he was calling for an AM *break* (complete with his *handle*) on Channel 16—which even the rankest newcomer to CB soon learns is used nationally for sideband operations! *Oh hum*—Uncle Charlie, *please* don't fizzle out on this project! . . .

TOMCAT JR. tells me that he met a guy who was trying to peddle a used 250 watt *footwarmer* (linear amplifier) at a San Diego area coffee break. His claim was that it didn't have enough *pizzazz*—the reason he knew this is that it caused *only* a half dozen of his neighbors to complain about TVI. He said that he had replaced the 250 watt unit with a 500 watt job which he knew was really "doing the job," since about 15 neighbors had started squawking and at least 2 "For Sale" signs had gone up on his block! . . .

INDUSTRY STUFF: Although I do not generally pour all sorts of CB industry stuff on my readers, it is worthy of note that for the past few months the CB industry has been going through some widely varied changes and self-examinations. Sales of 40-channel equipment have not quite lived up to expectations, the number of CB dealers has gotten smaller than it was a year ago, and there are a few manufacturers who have been at the *Excedrin* bottle trying to figure out their next move. One of the problems being that in 1976 everybody was pro-

ducing 23-channel sets as if there was a very hungry *CB-monster* eating everything which could be displayed on a store counter; then the FCC's 40-channel announcement came—badly timed and oddly conceived so as to put a dent in last year's Christmas sales of CB gear since many CB'ers simply decided to hold off buying until after January to see what the new 40's looked like, despite (later regretted) "sales incentive" rumors started by several dealers saying *not* to wait for the new 40 channel sets since they wouldn't have as much talk-power as the older 23-channel sets. There was also noted a panic move within some quarters of the industry to start dumping 23-channel sets at almost unbelievable prices in order to clear them out. Well, what with one thing or another, several sets of overlaying circumstances produced the end result that the industry had (somewhere along the line) stumbled upon a manner of producing lower sales than expected in a potential market which, oddly enough, simultaneously has the FCC receiving more CB license applications than ever before! You figure it out—if you can, you'll be better than some very important sales executives in the CB equipment field! This year has shown a drying up of supplies of the 23-channel rigs and many dealers report that this has caused an increase in 40-channel sales, there are more than a few dealers out there in radioland who tell me that they expect to sell so many 40-channel sets this Christmas season that they hope their supplies hold out sufficiently to meet their needs and the orders which they placed several months ago when things looked pretty slow for them! In any event, the CB market is still in a state of transition, and there will undoubtedly be several manufacturers who will be gone from the scene when the transition is over—it's really a bizarre situation, more than 20-million potential customers out there in CB-land, the 40-channel equipment is reasonably priced and (I have found) better sounding than the previous generation (23-channel) gear, and there are thousands of dealers who are eager to offer competent sales and service on the equipment—and yet *something* is missing; why aren't all of these ingredients jelling into a market that is 30 to 40% more active than it is? Think you have the answer? If you do—and can keep it to a reasonable length—drop me a card or letter and lay those great ideas on all of us. If enough folks care to venture some worthy suggestions on the CB market, well, I'll run some of those ideas in CB RADIO/S9 and maybe *you* will be the one with the golden words of advice. C'mon—add your 2¢ worth—why not? Get your messages in by December 30th. Address them to me. . . .

Mike (THE REBEL) from San Antonio passes along the story (he says is true) of the local gal on Channel 20 who bought hubby a base station for his birthday. Problem was that he turned into such a ratchet jaw nobody else could use the channel when he went into his jabbering. Worst of all, he started trying to elbow his wife off the mike after she had only a few seconds on the channel—this was done by asking those other operators on the channel to vote *yea* or *nay* on giving him his turn. There were always so many negative votes that wifey finally had to put his use of CB on strict limitations; he has to give others on the channel a chance to speak, including his wife! . . .

DIDJA EVER DEPT: Red, UNIT 1506—DELTA, asks didja ever await the arrival of a piece of CB gear and when it finally was delivered you found that it was packed for shipment inside a carton filled with old newspapers? Funny how, no matter how eager you are to get your hands on the piece of CB gear and put it on the air, you just can't resist the temptation to unfold one of the balls of crumpled old newspaper packing to see where it's from and the date of the copy! Personally, I can spend a good 20 minutes reading through one of these—always interesting to know what happened 6 months ago 3,000 miles away! . . .

. . . Well, I really did it this time! In the October issue (page 62) I told you of my problems wrestling with some guy's Tennessee dialect which was so alien to my northeastern ears when trying to copy him on Channel 19 while I was in Tenn. He kept telling me his handle was BIG TIN FORD, which I kept misinterpreting as A BIG 10-4. No sooner had the October issue gone out in the mails and into the hands of subscribers than I got a postcard from Tennessee CB'er HILL MAN, who says that I must *really* have the smog in my ears. Sez he knows the operator I was talking to and the guy wasn't telling me his handle was BIG TIN FORD, but that it was BIG TAN FORD! Ooops! . . .

Would you believe that I still receive a considerable volume of mail each month asking for additional information on building the *Vampire Bat Antenna* which appeared in our April, 1976, issue. This despite the fact that it was clearly stated in the article (and several times in other later issues) that it was an *April Fool* story! People still want to build it and try it! . . .

SIGNS OF SUCCESS DEPT.: Many readers sent me copies of a nationally published newspaper crossword puzzle which happened one day to be about CB Radio. Seems that 38-Across wanted puzzlers to state the "handle used by CB Editor," the answer was TOMCAT . . . On the other hand, a

fellow I know received a letter from the HQ of a large national Ham organization. Even though it was written on their fancy embossed letterhead it bluntly implored the fellow to "toss TOMCAT into Long Island Sound!" Can't win 'em all I suppose!...

FUNNY STUFF: Did you latch on to a couple of *Pet Transistors* yet? Seems like they're the talk of the CB crowd—*really* funny and clever! A great holiday gift for *anyone* into electronics!...



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BETTER LEIGHTON NEVER

OUR KEEN TEEN CB SECTION

BY ROBERT LEIGHTON, CHOCOLATE MOOSE



A CB Christmas



'Twas the night before Christmas and all the CB's
Were buzzing with Buddies and their Christmas trees.
The stockings were hung from antennas with care
With hopes that St. Ratchet-Jaw soon would be there.
The kids turned their rigs off and hopped into bed
And waited to hear hoofbeats clomp overhead.
The silence was dreadful—each little one's ear
Was poised for whatever small noise he could hear.
When far, far away from way up in the sky
Could be heard, "Hey, Good Buddy, this rig sure can fly!"
This year, old St. Ratchet-Jaw left the deer home
And went round in an eighteen-wheeler, bright with chrome.
Each part of its systems were glowing with flame
As Ratchet-Jaw checked them and called out each name.
"On, headlights! On, motor! On, seatbelts! On, brakes!"
"On, steering! Transmission! Exhaust! Mercy sakes!"
And then on the roof there arose such a clatter,
The household woke up to see what was the matter.
The truck tried to land on the roof, so they say,
But it weighed twenty tons, and the shingles gave way.
As the boards and the plaster proceeded to crack,
The kids and their parents yelled, "Quickly! Move back!"
Well, the rear of the truck fell in first, with such force
That the goodies inside it jammed open its doors.
As the trailer sprung open, a great wave of toys
Rained down just in front of the good girls and boys.
The CB's, antennas, fuzz busters and such
Delighted the kids, who yelled, "Thanks very much!"
And as Ratchet-Jaw saw all the damage, with fright,
He ran away, shouting, "Merry Christmas, goodnight!!"



CAPTAIN BRAVERY

CITIZEN'S BAND'S FIGHTING MAN!

PART FOUR

IN OUR LAST EPISODE, THE EVIL **STERLING FELDSPAR** HAD JUST INTRODUCED THE MYSTERIOUS **COSMO FLETCHER** TO THE BEAUTIFUL **DARLENE HUMBOLDT**...

I'D LIKE YOU TO MEET THE KEEPER OF THE HIDEOUT, **COSMO FLETCHER!**

YOU SAID THAT LAST MONTH, JERK! CAN'T YOU READ?

ALL RIGHT, SO I WASTED A PANEL... COME HERE A SECOND...

WE'RE GOING IN, BUT I WARN YOU--YOU MAY NOT LIKE WHAT YOU SEE!

KEEP OUT!

Watch it, Bub!

AWAY!

SKY DADDLE!

WHY? IS IT... A TOOL OF DESTRUCTION?

AS A MATTER OF FACT, IT IS. BUT I HAVEN'T CLEANED IN THERE IN THREE MONTHS!

HERE IT IS! THE SINGLE GREATEST CREATION OF ALL MANKIND! (EXCEPT FOR VEG-O-MATICS)

DCBR

IT LOOKS GREAT, MR. FELDSPAR, BUT... WHAT DOES IT DO?

WHAT DOES IT DO?... WHAT DOES IT DO? IS THIS WHAT YOU'RE ASKING ME? WHAT IT DOES?

YES!

UM... 'DOES'. LET'S SEE... DARKTIME, DELTA TUNE... UM... DIAPERS... DILL PICKLES... DOUBLE NICKELS... DOES! WHAT... IT... DOES!

BAO GUYS CLUB

IT'S A DE-CB'ER, MY DEAR. AND IT HAS THE POWER TO WIPE OUT EVERY LAST CB IN THE WORLD!

OH NO!

AND WHAT'S THIS?! CAPTAIN BRAVERY HAS RESUMED HIS ALTER-EGO FORM OF YOUNG FRED KLUBESTER! WHY?!

WELL, HECK! I'M STILL A KID, Y'KNOW! I DON'T KEEP THE BRAVE BIT ALL YEAR, Y'KNOW! I DESERVE PRESENTS TOO, Y'KNOW! NOW GET LOST!

MERRY CRISPNESS, FOLKS, AND HAVE A NEW YEAR.

WHAT DOES MR. FELDSPAR WANT WITH DARLENE? WILL THAT AWFUL INVENTION EVER BE USED? WHAT COULD BE IN THAT BIG, WRAPPED BOX, DO YOU SUPPOSE? FIND OUT IN THE NEXT INSTALLMENT OF...

CAPTAIN BRAVERY Citizen's Band's Fighting Man!
—LEIGHTON—

Don't Go Away There's More Great Leighton On The Next Page.

Test Your Knowledge of CB Lingo!

If you've had your ears for a while now, you can probably talk over a CB automatically. I mean, you can ratchet-jaw all you like and never even think before you say something. In fact, I know quite a few people who do that anyway! But what if you were tested? What if you *did* have to stop and think about all those strange terms we use? What would you get as a score? Take this simple test and see.

1. A good buddy tells you he's going to "cut some Zs". You
 - a) Ask for a slice
 - b) Offer to put the Z's back together
 - c) Sing him a lullabye
2. What is "ALERT"?
 - a) Affiliated League of Emergency Radio Teams
 - b) Association of Lithuanian Extremely Right-handed Teachers
 - c) American Legacy for Eventually Retiring Trombonists
3. Someone asks you for a 10-36. You answer
 - a) "It's 10:36! Why'd you even ask?"
 - b) "Does anybody really know what time it is?"
 - c) "It's exactly 1,440 minutes past yesterday."
4. What is a "Smokey"?
 - a) A fire
 - b) A policeman
 - c) A fired policeman
 - d) A car on fire
5. "Affirmative" is to "Negatory" as
 - a) "Up" is to "The other way"
 - b) "In" is to "Quasimodo"
 - c) "Yes" is to "No"
6. Using the phonetic alphabet for clarity, which word is best used to express the letter "P"?
 - a) Papa
 - b) Phonetic
 - c) Psychedelic
7. What are 88's?
 - a) Strong 73's
 - b) Weak 89's
 - c) Two large 36's and a hunchbacked 16
8. You are doing "double nickels" on the highway. This means
 - a) There is a 10¢ toll ahead, but they only take nickels
 - b) You're going the national speed limit of 55
 - c) You've stopped short, but instead of 'stopping on a dime', you've merely 'stopped on two nickels'
9. What is an "eighteen wheeler"?
 - a) One tractor trailer truck
 - b) Six infants on tricycles
 - c) Nine teenagers on skateboards
 - d) Eighteen circus performers on unicycles
10. What does a "Fuzzbuster" do?
 - a) It busts fuzz
 - b) It fusts buzz
 - c) It buzzes fust
 - d) It butzes fuss
 - e) Anything it wants to
11. A friend of yours announces that he has a "Pregnant Roller Skate". You
 - a) Don't ask any questions, just accept the cigar and congratulate him
 - b) Ask him when he thinks it's due
 - c) Offer to take the 'pick of the litter'
12. What does "XYL" mean?
 - a) Ex-Young Lady
 - b) Examine Yetta's Logarithms
 - c) Xerox these Yellow Letterheads

ANSWERS:

a (21)	q (8)	q (7)
a (11)	a (2)	q (8)
c (01)	a (9)	a (8)
a (6)	c (5)	c (1)

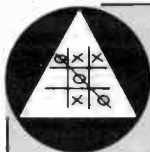
How to rate yourself

1 to 3 wrong: You have a true command of speaking the CB lingo and should go into it professionally. You won't make much money but at least you'll know what you're talking about.

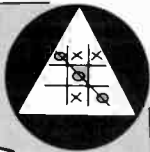
4 to 9 wrong: You don't know as much as you might. Try tuning on the CB, it will enable you to hear the way other buddies speak.

10 to 12 wrong: Maybe you should just become a government employee or something. I don't know.

More than 12 wrong: You took the wrong test. We only gave you 12 questions in the first place.



Shrivelled Defense Units Report!



**CB's Greatest
Do-Nothing Teams.**

GREETINGS *Shrivelled Defense* members, and prospective members. This month we have a report on the activities of *Shrivelled Defense Team #9987* in western Nevada, major parties in a massive search and rescue operation.

Monitoring on Channel 13½, the official *Shrivelled Defense Corps* channel, they detected a garbled message which could only be understood as "lost—nine!"

Creaking into action to come to the aid of what were apparently nine lost people, Team #9987 assembled all 16 of its members and took to the desert in vans, pickup trucks, motorcycles, and on foot. Forward they went, the intrepid Team, venturing forth into the unknown sands.

From time to time, the mysterious message—lost—nine, would repeat itself over their radios. Once in a while there were other garbled and cut-off words tossed in, someone said that they heard the words *broken rubble*—others heard the words *much fear*—these terse messages only served to encourage the searchers to continue their good work with increased enthusiasm.

For two days through sand dunes and cacti they wandered, tracing the elusive and feeble radio signals as they crackled through their loudspeakers—sometimes getting louder, other times fading into the stillness of the burning sands.

Finally, by a rocky mesa they came upon the source of the messages—it was ol' Harlan Furd, not only a member of *Shrivelled Defense Team #9987*, but also the official village idiot of one of the nearby ghost towns. Seated atop a pile of stones by an opening in the mesa. Furd was happily transmitting and reading a copy of the *Miners' Gazette*—for in addition to being a member of *Shrivelled Defense*, Furd was a gold miner.

Lost? *Hell no!* In fact Furd was jubilant—he had actually found the area's fabled *lost mine*. That was his radio message—a *happy shout* about the *lost mine*—and



Harlan Furd; caller in the wilderness!

a request that they replace his *broken shovel*, and bring *much beer!* Unfortunately, the *Shrivelled Defense* rescue members misinterpreted *all* of these messages.

Before long, it dawned upon them that they had undertaken their search and rescue mission minus any coordination with other authorities—like the Sheriff, the

State Police, the CAP, or anybody else; *they* were the ones who were lost. Furd insisted that they *weren't* lost, since *he* knew where they were—and that would be approximately 14 feet to the left of the entrance to the mine.

Luckily for members of the *Shrivelled Defense Team*, the finance company came around to collect an overdue car payment from one of the members and it was only then that his wife realized that she hadn't seen him in a week or so. She then reported this to the local authorities and a full scale search and rescue mission was instituted.

Some folks later said that all search and rescue operations by various CB teams and clubs should not only be channeled through local public safety authorities—but perhaps they should be coordinated with and directed by those authorities. But other people said *bunk*—that authorities can always be called in at the last minute if something goes wrong! So—we congratulate *Shrivelled Defense Team #9987* for being a major factor in this statewide search and rescue mission which called into play the Sheriff, the State Police, the CAP, and 250 CB'ers who were working through those agencies!

Not yet a member of *Shrivelled Defense* yourself? The snappy membership certificate we ran in our October issue has been reprinted in all of its ghastly glory on quality stock—ready for framing and adorning the wall of your radio room. Let your pals know that you are a member of CB radio's most confused and uncoordinated emergency effort! For one of these fantastic and beautiful certificates, sent postpaid, send \$1.75 to *Shrivelled Defense, c/o CB Radio/S9 Magazine, 14 Vanderventer Ave., Port Washington, N.Y. 11050*. Make checks payable to *CB Radio/S9*.

And if you've got a report of confused and botched emergency work—send it and we'll run it here!

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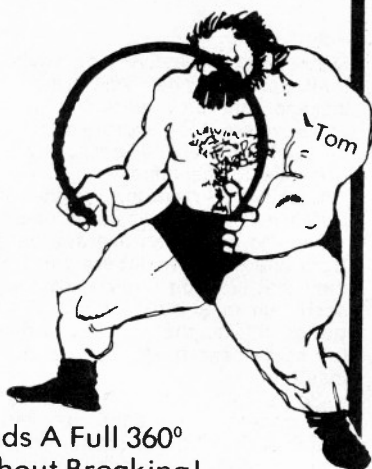
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WASHINGTON OUTLOOK

WHAT'S HAPPENING AT UNCLE CHARLIE'S

FIVE ALABAMA OPERATORS FINED FOR OPERATING ON SO-CALLED "LF" FREQUENCIES RESERVED FOR MILITARY USE

John L. Turnbull, Austin E. McAllister, Perry W. Hobbs, James W. Norred, and Harmon L. Phillips were fined \$500 each in U.S. Magistrate's Court, Opelika, Alabama, after pleading guilty to charges of operating illegal radio transmitting equipment and operating on unauthorized radio frequencies.

U.S. Magistrate John V. Denson, II, Opelika, Alabama, fined the five operators \$500 each after each pleaded guilty to two counts of operating illegal radio transmitting equipment and operating on unauthorized radio frequencies most of which were in the "LF" range from 26.762 MHz to 26.935 MHz. U.S. Magistrate Denson found that radio frequencies in this range were allocated and assigned for military use by the United States Army at Fort Benning, Georgia, approximately 10 miles from Phenix City, Alabama. (See the expose on "LF" CB in last month's issue of CB Radio/S9.)

The cases were presented by Assistant U.S. Attorney David Allred of the U.S. Attorney's office in Montgomery, Alabama for the Middle District of Alabama following an investigation by FCC Agents from the FCC's offices in Atlanta, Savannah, and Powder Springs, Georgia.

The cases arose from a November 1976 crackdown on illegal radio operations in the Columbus, Georgia and Phenix City, Alabama areas. The crackdown was ordered by Ira DeMent, U.S. Attorney, Montgomery, Alabama and Ronald T. Knight, U.S. Attorney, Macon, Georgia. At that time a number of CB transceivers modified for use on unauthorized frequencies along with CB linear amplifiers and modified amateur radio equipment were seized by U.S. Marshals accompanied by FCC Agents.

MYSTERY WHISTLER SILENCED— LICENSE SUSPENDED

FCC Administrative Law Judge James K. Cullen Jr. has suspended until May 8, 1978, the authorization of Donald E. Miller of E. Linthicum Heights, Md., to operate under his currently filed renewal application for a Second Class Radiotelephone Operator license.

(Although a Radiotelephone Second Class Operator license does not authorize the holder to place a transmitter on the air without a valid station license, it does allow the holder to make adjustments or tests while a radio station is transmitting and to determine whether the station is operating properly.)

Last December 15, Miller's license was designated for hearing to determine whether he willfully and knowingly violated the rules by failing to identify his station properly (Sections 13.66 and 21.213), by transmitting unnecessary, unidentified and superfluous radio communications (Section 13.66) and by interfering with and causing interference to radio communications and signals (Section 13.69).

The prehearing conference and hearing were held March 7 in Baltimore, and the record was closed on that date.

Judge Cullen said that for a considerable period of time the C&P Telephone Company had been receiving complaints from its mobile radio customers of interference to the Domestic Public Land Mobile Radio Service channels in and around the Baltimore area. He said the interference, a very loud penetrating wolf whistle (causing the culprit to be known as "Baltimore Whistler") would continue and interfere with people trying to use the regular channel.

Because of its inability to resolve this matter, C&P sought help from the FCC Baltimore Field Office in October 1975. Acting on a "hunch" from C&P that Miller, a C&P employee, might be the "Whistler," engineers from the field office began observing Miller's actions.

On November 18, 1975, and again on January 13, 1976, two FCC engineers heard harmful and unnecessary interference over the airwaves. At the same time, they observed Miller with the handset up to his ear and his lips in a whistling position. At no time while he was being observed did Miller make any identification over the air as required by the rules.

The engineers testified that during their surveillance of Miller, the unlawful signal could not have been coming from another vehicle.

Miller contended that he was, mostly

on his own time and under very adverse conditions, attempting to locate a station that was disrupting channels and that the sounds attributed to him very likely were from another transceiver in the general area or the result of a malfunctioning transceiver in his car that was rebroadcasting information picked up by a scanner on the floor of his car. This malfunction, he said, was discovered later and corrected. Miller also stated that only on rare occasions did he blow into the microphone for a second to see if he could override the whistling noise already on the air and that this was done with the full knowledge and consent of a C&P engineer.

Although acknowledging that he had transmitted without identifying his station, Miller argued this was only a technical violation since he had been assisting his employer.

Judge Cullen found that Miller, by his own admission, willfully and knowingly violated Sections 13.66 and 21.213 of the rules by failing to properly identify his station on November 18, 1975, and January 13, 1976, adding that Miller's testimony indicated that he had incurred this same violation at other times when he was not monitored.

Since Miller has been an FCC licensee for many years and his work has long been in the communications field, the judge said he was, or definitely should have been, completely familiar with the rules requiring identification when transmitting. Therefore, Judge Cullen concluded that violation of these rules had been proven.

Noting Miller's fine past employment record with C&P and commendations from his superiors, Judge Cullen said there was sufficient doubt as to just what Miller's actions and intentions were regarding the transmission of unnecessary or superfluous communications. As such, the judge said, Miller would be given the benefit of the doubt with respect to these violations. However, Judge Cullen pointed out, this did not excuse Miller's failure to identify.

Therefore, Judge Cullen suspended until May 8, 1978, Miller's authorization to operate under the currently filed renewal application for a second class radiotelephone operator license and held in abeyance grant of the renewal until that date.

The initial decision becomes effective in 50 days unless there is an appeal or the Commission reviews it on its own motion.

WAIVER OF CB POWER RULES DENIED

The FCC has denied Tram/Diamond Corporation reinterpretation or waiver of the rules to allow the use of a vacuum tube rated in excess of the 10



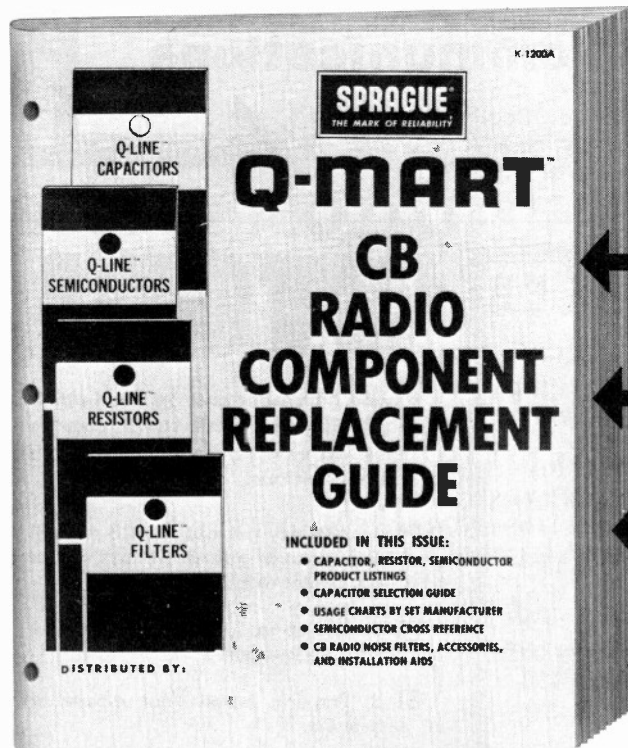
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watt limit as the final radio frequency amplifier in some of their CB transmitters.

(Section 95.645(c)(5) of the rules limits such power to 10 watts.)

Tram/Diamond said the equipment design would limit the obtainable power of the transmitter to within the spirit and intent of the rules.

The Commission noted that in August of 1976 it revised the rules for CB radio to add 17 channels for the service, and to tighten the allowable level of spurious and harmonic emissions for transmitters. In an effort to stop the proliferation of equipment not meeting the new standards, the manufacturing of transmitters type accepted

prior to September 10, 1976, was required to stop by this August 1. Marketing of these transmitters has to stop by next January 1.

Because of these revised type acceptance requirements, Tram/Diamond was required to obtain a new grant of type acceptance and certification to continue manufacturing and marketing their type D201 transceiver.

The Commission noted that the Tram/Diamond model D201 had received a grant of type acceptance prior to the effective date of Section 95.645 (c)(5) (May 24, 1974) but pointed out that at the time the rule was implemented, the FCC had said that "type acceptance may be withdrawn from currently type accepted equipment not meeting the new requirements."

Noting that Tram/Diamond had adequate notice that the grant of type acceptance for its D201 transceiver could be revoked, the FCC said Tram/Diamond had been aware of this dissipation limit rule for quite some time and could have made prior changes to the equipment to comply with the rules.

It said the D201A 40-channel transceiver already had been modified to provide for the larger channel capacity and to guarantee that the transceiver would meet the regulations associated with 40-channel operation.

Therefore, the Commission said, ample time had been given for any associated redesign that would be required for the substitution of a different tube which would meet the 10 watt plate dissipation limit.

FCC SAYS IT DOES NOT ASSIGN CB "HANDLES"

The FCC said it did not assign or register "handles" for Citizens Band radio operators.

The popularity of CB "handles" has given some operators the false impression that the Commission assigns them, the FCC reported. It added that it received many requests from CB licensees and applicants each month seeking assignment of a specific "handle."

The Commission made clear that it assigned call signs only for CB radio identification. These call signs consist of either three letters followed by four numbers, or four letters and four numbers. These must be used by the CBER to identify himself on the air.

"Handles" may be used with the assigned FCC call signs, the Commission said, but are not a substitute for them. This also applies to Unit Number ID's and Sideband identification numbers which are in general use.

See the CB Fix-M-Up section in this issue concerning how to obtain AM "Unit Numbers" and national Sideband ID numbers.

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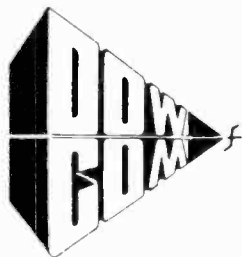
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12-77

Paper Doll (KMI 4549) looks at the stars

YOUR ASTROLOGICAL CB PERSONALITY



Sagittarius
November 22 - December 21



GOOD grief! Galloping Sagittarians surge straight ahead toward their final 20, edging out their competitors by at least a nose. These energetic people excel in all sports endeavors—archery being one of them where they can shoot out their philosophic anecdotes of wisdom. Avid historians and linguists of the zodiac, Sagittarians are a learning experience in themselves. With their love of travel they comprise a good number of sidebanders and ham operators. Check out their walls full of cards. They be long distance travelers fer sure, and sometimes live part or most of their lives in a foreign country. Super witty and full of good humor, you'll never starve for a laugh when they're around.

They also definitely be the biggest hearted of the twelve signs, often sacrificing to make loved ones happy. You'll never find a Grinch among them. You will find many a courtroom judge, leading composer, musical conductor or comedian among them, though. Their built-in sense of fairness and gift of musical aptitude puts them center stage—spotlighted. If you just don't forget the golden rule with Sagittarius, you'll boogie-boogie with them happily down life's boulevard enjoying their special ways of entertaining you. Typical Sagittarian handles might be: Slingshot, Choppers, Sleeping Beauty, Donkeyduster, Sharpshooter.

DECEMBER STAR CHECK

SAGITTARIUS—Sagittarians take on a dreamy new look on the 16th that brings many an admiring eyeball. Compliments clutter your channel all month long. Everything else seems to do a bouncearound mid-December when three planets all put their gears in reverse at the same time. A loving voice from the past comes back to haunt you on the 13th.

CAPRICORN—Christmas convoys of frantic shoppers keep you off the road till the last minute when you procrastinating Capricorns dash around to get the appropriate gifts for loved ones and work 20 superiors. Keep those receipts for items purchased on or after the 12th. End of December brightens up as Sun lights the way to a Happy New Year, 4-roger!

AQUARIUS—Free wheelin' Aquarians definitely make the social scene this month and meet someone dreamy on the 16th. Another good buddy returns on the 12th. Better half pulls a 10-7 also on the 12th and goes on retreat. Best plan for a quiet secluded holiday only with those close kinfolk.

PISCES—A Christmas bonus comes just in time for that last minute shopping—or a retroactive paycheck is finally paid you. Mid-December may see you househunting again if you have not already settled down in a new one. End of December bows out with a New Year's Eve of good company and fun.

ARIES—Those long range home 20 plans you were making may have to be put aside for awhile. Other planets join forces on this backward loco-motion around the 11th affecting rebellious young 'uns, recreation and leisure time. Despite the odds, you still manage to get a cheery unexpected Christmas bonus.

TAURUS—Business-wise Taureans get a second chance this month to capitalize on a new enterprise and recoup any business losses that would otherwise have to be written off. Ski-land travel may be involved in conjunction with that business. Home 20 will have to be neglected in favor of greenstamp return. Just be sure home 20 is properly checked out for security and safety before leaving.

GEMINI—Better half shares the super holiday spirit with you this season and lends a helping hand as relatives you haven't seen in years pop in on you starting as early as December 11th. Curb appetite end of month when all that visiting and extra holiday indulgence could cause your normally slight frame to expand.

CANCER—Good grief Cancer! You sentimentalists keep finding more and more good buddies to add to that gift list, and that last minute shopping definitely breaks the piggybank. Caution and extra security are advised on the 11th and 12th to guard against greenstamp loss. Keep receipts for all purchases after those dates. Work 20 holiday partying is fun on the 16th.

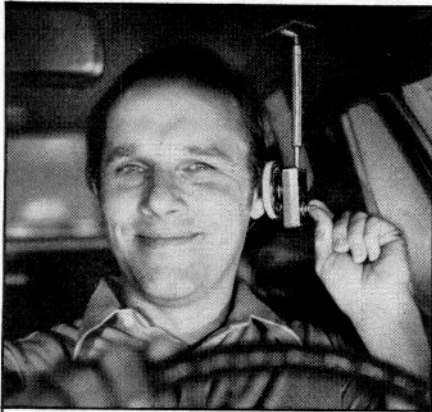
LEO—Single YL and buffalo Leos will be meeting some out of this world eligibles on the social scene after hours this month. Better back it down around mid-month when physical stamina runs out and leaves you depleted for that all important New Year's Eve. Young 'uns provide wealth of pleasure in a special way to Leos this month and are included in festive holiday plans.

VIRGO—Just as added responsibilities begin to creep in over Virgo's heads, they slip away again temporarily. Home 20 is scene of family get-togethers and reminiscing over the merry yule season. On the 15th you may receive a super luxurious gift from loved one.

LIBRA—Librans boogie-boogie down the crowded boulevard all month, hearing some dreamweaving modulations from some strangers, particularly on the 16th. End of December festivities are held at home 20 where gracious Librans throw a super bodacious New Year's Eve Party.

SCORPIO—A wealth of information filters your way this month for you enterprising Scorpios. Mid-December sets your wheels a spinning, both mental and mobile, to find those unusual personalized gifts for your special loved ones, 10-4. Warm greetings and modulations reach you end of December in time to brighten your happy holidays. Better half gets another shot at a super opportunity as fortunate planet does a return.

... 73's and 88's
till next month



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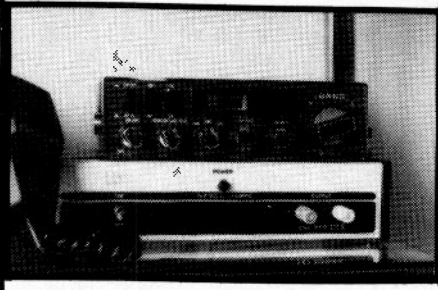
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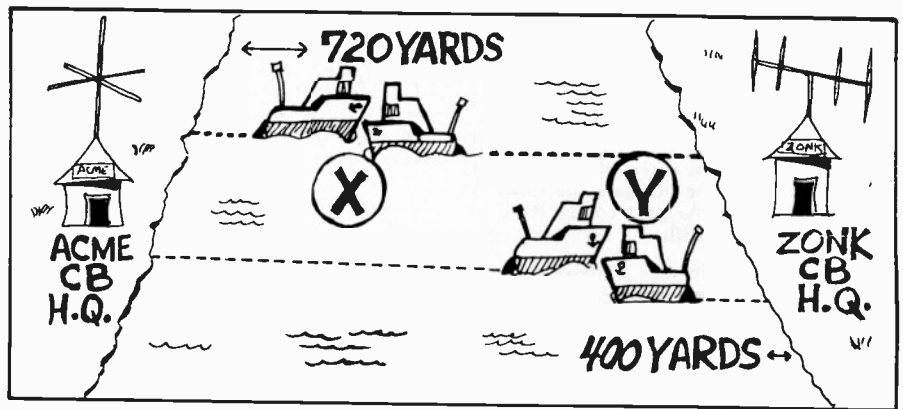
BRAIN BUSTER ANSWERS

don't peek here 'til you've busted your brains on page 36.

RESCUE PATROL BOATS

You were told that the 2 rescue vessels started simultaneously from the sides of the river and met at (on our diagram shown here as "X") a point exactly 720 yards from one shore. A glance at the diagram clearly shows that the combined distance which both have traveled is equal to the width of the river and that the Acme boat has gone 720 yards. Well, they continue their journey and reach the opposite side of the river. (The time spent visiting the other CB club's HQ makes no difference.) They start on their return trip and meet at "Y", as

shown. Now, the distance travelled by both is equal to 3 times the width of the river, as shown by the lines, so it is obvious that each boat has 3 times as far as when they first met. The Acme boat had gone 720 yards, so it has now gone 3 times that distance, that is, 2160 yards, to "Z". This the sketch shows to be 400 yards more than the width of the river, so all of the math you have to do is deduct 400 from 2160 to find that the river is 1760 yards wide, which is exactly one mile—all done without the aid of algebra or sliderules.



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At Wierd Willie's there was a remarkable cut in prices because he first reduced the price \$3 for each \$5 of original price, with subsequent reductions at the same ratio. The next should be to his original cost of 52.2¢.

BIG BUSINESS

Billy and Chuck won out by 220 directories.

DX KORNER

DON JENSEN REPORTS ON THE INTERNATIONAL SHORTWAVE SCENE

Send SWL reports to:

Don Jensen
c/o CB Radio/S9 Magazine
14 Vanderventer Ave.
Port Washington, NY 11050

BACK in July's *DX Korner* I wrote about the Israel Broadcasting Authority, whose powerful shortwave signals can be easily heard in North America. But for the IBA, I pointed out, not was all sunshine and roses. Some critics, here and within Israel, complain that the IBA should air more English language programs.

But in the Middle East there is another side to the shortwave broadcasting coin—the Arab stations. While these stations, in Egypt, Syria, Iraq, Saudi Arabia and in the smaller sheikhdoms have a tremendous impact on listeners in that region, they also have generated some major internal problems as well.

Typically these Arabic stations like to think of themselves as promoting Pan-Arab unity. In fact, they frequently serve to split apart the various Arab nations.

According to Associated Press correspondent Aly Mahmoud, "Radio plays a key role in forming Arab public opinion because of the emphasis on the spoken rather than the written word, a result of the spoken language's ability to incite emotion and of the fact that 70 percent or more of the Arab public cannot read."

Another Arabic journalist has called radio a thermometer of political emotion in that part of the world.

"But this emotion is so volatile that the thermometer keeps going up and down like a crazy acrobat."

In two years, Radio Cairo went from calling Libyan leader Muammar Kadafi "brother" to terming him a "Communist puppet." And, "brother" was also the term the Libyan People's Broadcasting Service used to describe Egyptian president Anwar Sadat. Today he is called an "American hireling" and "CIA agent."

Likewise the shortwave stations in Iraq and Syria are now trading verbal blows where, not long ago, peace reigned.

According to the AP's Mahmoud, literacy is so low in the Arab-speaking world that people listen to the ubiquitous transistor portable far more than they read. Furthermore, spoken Arabic is a poetic language, for all its harsh sound to western ears, and listeners often are moved by the tone and style of radio commentators rather than the meanings of the broadcasts.

In fact, an Egyptian broadcaster was quoted as saying the Arab radios "won the 1967 war that unfortunately our military leaders lost on the battlefield."

The better educated understand the propaganda usage to which the Arab shortwave voices are put. Political lies are commonly referred to as "kalam izaat," Arabic for "radio talk."

Says one Arab ambassador, quoted by the Associated Press writer, "We Arabs are slaves of our beautiful language. Our voice is frail when we call for unity and roaring when we preach disunity."

Though few readers of *DX Korner* are fluent in the Arabic language, hence will miss out on the contents of the Arabic programming from these shortwave stations, it is possible to learn much about the various views aired by these broadcasters in English.

Probably one of the easiest stations in this part of the world to hear is Egypt's Radio Cairo, with its powerful shortwave transmitters and fairly extensive schedule. You can try 9,805 kHz around 2200 GMT. Or, tune 7,120 or 9,475 kHz between 0200 and 0330 GMT for English programming.

Also readily logged is Radio Kuwait, with English programming from 1700 to 2000 GMT on 9,580 and 12,085 kHz.

The Broadcasting Service of the Kingdom of Saudi Arabia (BSKSA) can be heard in English around 1900 GMT on 11,855 kHz.

English programs from Radio Jordan are broadcast from 1800 to 1830 GMT on 9,560 kHz. Nearby Iraq's Radio Baghdad has English broadcasts from 1930 to 2030 GMT on 9,745 kHz.

Three tougher-to-hear outlets in the Arab world are:

Radio Sana, in the Yemen Arab Republic, which broadcasts in Arabic on 9,780 kHz, about 2000 GMT.

Democratic Yemen Broadcasting Service, at Aden in the other Yemen, the People's Democratic Republic of Yemen. This station uses 7,190 kHz, beginning at 0300 GMT.

At Abu Dhabi in the United Arab Emirates, the collection of sheikhdoms along the oil-rich Arabian Gulf, there is located the Voice of the UAE. This is not an easy catch but broadcasts on 9,620 kHz from 1400 to 2130 GMT in Arabic.

THE CLUB HOUSE

For the serious SWL and DX fan, membership in one of the listening hobby clubs is virtually a must. It is, probably, the best way of keeping current on the changing broadcasting scene. And it is a good way

to keep in contact with other people who share your hobby listening enthusiasms.

There are general clubs, organizations that cater to the many different facets of DXing, from shortwave to medium, ham band listening to monitoring the police public service VHF transmissions. And there are other organizations that focus in on only one or several interest areas.

Most clubs are alike in the fact that they issue mimeographed or printed bulletins for members. These bulletins are filled with useful info for the hobby listener.

Clubs come in all sizes and shapes, from the tiny group of friends living on the same block in the same city and, often, going to the same school, to major clubs with 1,500+ members around the world.

Some clubs have been around for years. One major DX organization this year celebrates its 50th anniversary. Others last a few months, then fold up for various reasons, but usually related to mismanagement or inexperience on the part of the club officers.

As a result of the instability of some smaller and newer hobby clubs, I'm reluctant to do—as many fledgling clubs request—the publicity “bit” for them. I don't want to give a weak club an implied endorsement and have readers join as a result, then lose their membership fee when the club later folds.

So, in these pages I mention only those clubs affiliated with the “umbrella” organization of hobby organiza-

tions, the Association of North American Radio Clubs (ANARC), headquartered in Pasadena, CA. ANARC affiliation is no guarantee of club stability, but because of the organization's requirements, member groups tend to have a solid financial and administrative footing.

In the coming months, in DX Kerner, I will highlight an ANARC affiliated club in each column. I'll tell you what types of DXing news the club bulletin features, how often that bulletin is issued, other services offered, how much membership costs and how you can join. Sooner or later, as the reviews are printed, you'll probably find a club that sounds like it fits your listening interests and needs.

I will begin these club reviews with the American Shortwave Listeners Club (ASWLC), headquartered in California. ASWLC was founded in 1959 and publishes a monthly news bulletin called “SWL.” This bulletin, printed by offset lithography, includes information on shortwave, utility type communications transmissions, QSL collecting and a “by-time” SW listening index for beginning and advanced DXers. A sample bulletin will cost you \$1; a yearly membership fee is \$12. ASWLC's address is 16182 Ballad Lane, Huntington Beach, CA 92649.

WHAT'S NEW

Radio Finland has begun a 90-minute service in English on Sundays. The program is heard from 1325 to 1455 GMT.

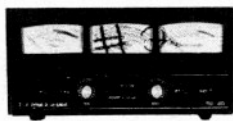
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"Radio Finland in its Sunday Best" is heard immediately following the 1300 GMT broadcast on 15,105 and 11,755 kHz.

The 90 minute program features a variety of programming, both new productions and repeats of highlights of the week. The regular Sunday Letterbox continues as before, answering listeners letters and playing musical requests.

Reception reports go to Radio Finland, External Service, P1 95, 00251 Helsinki 25, Finland.

THE RECEIVER SCENE—More interesting new receivers are on their way here from Japan. Before year's end, look for a dandy portable with electronic digital frequency readout!! The price should be under \$250, possibly as low as \$200.

Within two years, add-on digital frequency readout units, which should be compatible with existing short-wave receivers, will be commonplace. In fact the first of these "outboard" frequency readout units already are available for some SW receivers. Prices, at least at first, should be in the \$150-200 range—kind of steep, but who knows what competition will do to prices as time passes. Watch for ads.

ON THE FRINGE—A new type of noncommercial broadcasting station has been authorized by the Federal Communications Commission. The new class of broadcaster is the Travelers Information Station (TIS). These stations will be operated by local and federal governmental agencies. They will limit their broadcast ranges to the vicinity of air, train and bus terminals, public parks and historical sites, interstate highway interchanges, bridges and tunnels. The function of these stations will be to transmit warnings of road hazards, directions to parking facilities, lodgings and other traveler advisories.

The TIS stations will operate at either edge of the regular AM medium wave broadcast band, on 530 or 1610 kHz.

DOWN THE DIAL

SEYCHELLES—The Far East Broadcasting Associates (FEBA) station on this Indian Ocean island group can be heard with religious programs around 0300 GMT on 11,755 kHz. FEBA does change frequencies frequently. So if you don't find it here, tune around a bit.

MEXICO—XEWV, La Voz de America Latina, in Mexico City is one Latin that shouldn't be too difficult for most listeners. Look during the early evening hours on 15,160 kHz. Programming will be all in Spanish though.

CLANDESTINE—A clandestine station often pretends to be what it is not. The Voice of the Malayan Revolution, which obviously attempts to foment troubles in Malaysia does not indicate its origin but, according to the best available information it broadcasts from southern China. There is an English language program on 11,830 kHz from 1500 to 1530 GMT.

(Credits: Aaron Hywarren, Manitoba, Canada; Brian Alexander, PA; Don Rojewski, WA; North American SW Association, Box 13, Liberty, IN 47353).

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SIDEBAND ID NUMBERS?

They don't use "handles" to ID on the sideband channels, stations use "Sideband ID Numbers." If you're an active Sidebander you may already have several local or regional group ID numbers—if you're a newcomer or a future Sidebander, you may not have any Sideband ID numbers at all! Whether you have a dozen numbers or none at all, it's easy and important to you to get yourself a set of national ID numbers from the SSB Network, the oldest (1964) and most prominent national sideband group. Old timers, newcomers, and future Sidebanders should obtain information and an application for national SSB Network numbers by sending a self-addressed stamped envelope to: Sidebanders' Service Bureau, P.O. Box 381-XF, Smithtown, NY 11787.



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coming events

DECEMBER

Marion, North Carolina. 10th Anniversary Christmas Party of N.C. Radio Patrol Emergency Service & Community Watch, Inc. December 11th at the Community Bldg on N. Main St. For more info write club at Rt. 3, Box 68, Marion, NC 28752.

Queens, New York, Super CB Jamboree, December 11, 1977. Desert Inn, 30-80 Whitestone Pkwy. For further information contact: American CB Radio Club, Inc. P.O. Box 321, Bronx, NY 10469.

MAY

Louisville, Kentucky. Annual Memorial Day Weekend "Wake Break." May 26-27 & 29. Rest area on I-71 between Peewee Valley & The Jefferson Freeway exits at the 14 mile marker just east of Louisville. Sponsored by Metro-REACT.

The Staff of S9 wishes you and your family a Happy Holiday!



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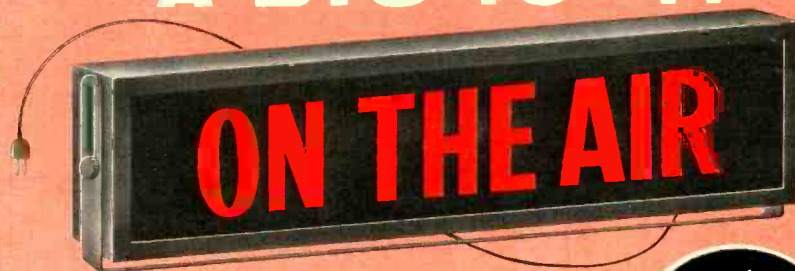


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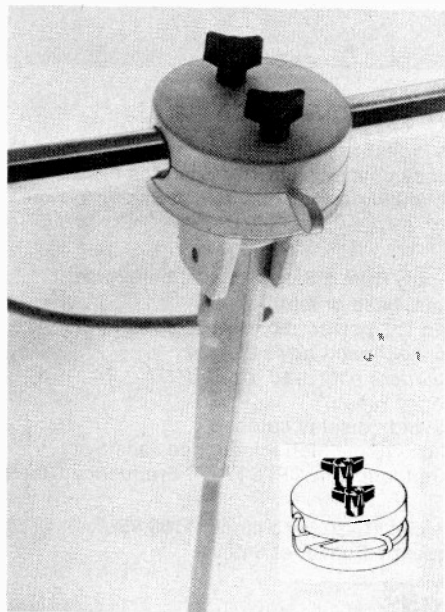
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"NO-HOLE" ANTENNA MOUNT FOR VHF MARINE RADIO

Boatowners with VHF Marine Band (or even CB) radios now can mount—or dismount—their antennas in seconds without drilling holes or chance of cracks or other boat damage.

A new antenna mount, molded of high-strength polypropylene with salt-water-safe fittings, attaches to standard 7/8-inch boat rails simply by tightening two wing nuts. It accommodates antennas such as the Shakespeare "See Bee 388", the Lafayette "Marine Mate", the Antenna, Inc. Model 38820, plus the Shakespeare Marine Fold-Down Model 495 for VHF Marine Band antennas, and even other non-radio accessories.

While the wing nut locking to the boat rail greatly simplifies installation, according to the manufacturer, owners also can remove the mount equally fast, eliminating the chance of antenna theft or damage when the boat is unattended.

Suggested retail price of the mount is \$8.49. For full information on the Model A-100 mount, contact Helm Products, Inc., P.O. Box 558, Addison, IL 60101.

NEW EXPERIMENTALS

KI2XCO, HARRIS CORPORATION, Rochester, N.Y. Station to operate on various discrete frequencies between 4530.0 and 19270.0 kHz to conduct experimentation required by a contract with the U.S. Government.

KI2XCQ, HARRIS CORPORATION, Rochester, N.Y. Station to operate on various discrete frequencies

between 4530.0 and 19270.0 kHz to conduct experimentation required by a contract with the U.S. Government.

KI2XCR, DORY J. NEALE, JR., Various Western States. Station to operate on 1620 kHz for communication essential to research project of petroleum exploration.

KI2XCS, ITT FILFILLAN, INC., Nutley, N.J. Station to operate on various discrete frequencies between 2268 and 29900 kHz for antenna testing in accordance with U.S. Government contracts.

KI2XCT, DR. R. K. ANDERSON, State of Wisconsin. Station to operate between 150.850-151.124 MHz in connection with research project of tracking small animals and birds.

KI2XCU, EMC CORPORATION, Honolulu, Hi. Station to operate on 161.73 and 161.76 MHz for equipment demonstrations.

KI2CX, THE WESTERN UNION TELEGRAPH COMPANY, Fairfax, Va. Station to operate on 45.18 MHz to develop and advance the Meteor Burst technology with a view towards its possible use in providing commercial communications services.

KI2XCY, THE WESTERN UNION TELEGRAPH COMPANY, Fairfax County, Va. Station to operate on 46.02 MHz to develop and advance the Meteor Burst technology with a view towards its possible use in providing commercial communications services.

GRANT STA TO AERONAUTICAL ADVISORY STATION

The Commission authorized its Safety and Special Radio Services Bureau to grant Trans Regional Airline (El Paso Air Transport) Special Temporary Authority (STA) to operate an aeronautical advisory station at Howard County Airport, Big Spring, Tex.

Trans Regional requested the STA pending the outcome of a comparative hearing proceeding between itself and Big Spring Aircraft, Inc. (BSA) for regular authorization to operate such an advisory station.

BSA, the previous station licensee, let its authorization expire without filing a renewal application and had ceased operation.

The Bureau ordinarily would not have the authority to grant the STA since the case is in a hearing status. However, the Commission said it would support the staff's granting the STA since the proceeding could continue for several months and the critical nature of this communication service to the safety of private aircraft made the STA in the public interest.

BSA indicated it had no objection to the action.

CB SHOP



Rates for CB SHOP are 10 cents per word for advertising which in our opinion is obviously of a personal and noncommercial nature. A charge of \$1.00 per word is made to commercial and business advertisers, publications, and all clubs and organizations of any kind (minimum ad \$40.00). Regular CB RADIO/S9 display advertisers are exempt from the CB SHOP minimum rate. A 5% discount is in effect for an advance insertion order for 6 consecutive months. ZIP code not counted as a word.

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Closing date is the 5th of the 3rd month preceding date of publication.

Because advertisers, services, and equipment contained in CB SHOP have not been investigated, the publisher 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, CB RADIO/S9 Magazine, 14 Vanderventer Ave., Pt. Washington, N.Y. 11050.

NOW FROM THE LARGEST WAREHOUSE IN THE EAST. Same day delivery for on the shelf stock. All major brands, 24-hour service. Send for dealer catalog. Send letterhead to: PALOMAR EAST LTD., 80 Blaisdell Road, Orangeburg, NY 10962.

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FAST! \$1.00 ENGRAVED HANDLE PINS. No minimum. 1"x 3" plastic. White letters on black, red, blue, green, walnut. Black on white, yellow. Black on gold, silver: \$1.50. 16 letters per line (2). 3 lines add 50 cts. HOLLY, Box 3926-H, Hollywood, Florida 33023.

CUSTOM PRINTED T-SHIRTS. \$2.00 each. American made, any picture, lettering. Minimum order 24 shirts. Call Toll Free 1-800-327-3794.

NOV-DEC SPECIALS!! 40 channels- Hygain9 \$150; Hygain10-\$130; Bird Dog Radar Detector (List-\$150)-Looks, mounts like foglight-nothing on dashboard-\$125. Free Price List More specials-CB's-Stereos-Televisions. Douglas Electronics, 37 Keklico Court, Charleston, S.C. 29408. (COD Orders-25% deposit required).

WHOLESALE TO ALL. Save up to \$100.00. Examples, Cobra 138 XLR, List \$349.95, Discounted \$249.95. SBE Sideband 4, Discounted \$239.95. Cobra 29 XLR List \$229.95 Discounted \$169.95. Bearcat 210, Discounted \$269.95. ALL BRANDS AVAILABLE. Write or call, (707) 544-4388. Visa/Master. Free shipping. McDonald Electronics, Box 7492, Santa Rosa, CA 95401.

STOP INTERFERENCE! This step-by-step easy to understand book shows how to squash CB interference to TVs, stereos, organs, telephones, PAs, many others. Extra Bonus! Stop noisy interference from motors, shavers, neons, heaters, other appliances. Fully illustrated. Only \$2.98 ppd. INTERFERENCE P.O. Box 284, Chestnut Hill, MA 02167.

NEW BEARCAT 210 AUTOMATIC programmable scanner. No crystals needed 110VAC/12VDC built in. Brand new \$275.00. Dennis Bird, 2307 North Benson Rd., Fairfield, CT 06430. 203-255-0812.

NEW BEARCAT 101 AUTOMATIC programmable scanner. No crystals needed. Brand new \$225.00. Dennis Bird, 2307 North Benson Rd., Fairfield, CT 06430. 203-255-0812.

C.D.E. HAM II ROTOR. Brand new \$130.00 Dennis Bird, 2307 North Benson Rd., Fairfield, CT 06430. 203-255-0812.

CB TESTS: Break. CBers! Are you a "ding-a-ling," "greenapple," or "B-T-O," etc.? Test your CB knowledge with this set of 5 tests. Send \$1.75 (plus 25 cts postage and handling) to: CB Tests^R, P.O. Box 191-A, Stratford, NJ 08084. OVER!

TIRED OF ALL THE 11 METER (CB) CLUTTER? Upgrade to ham on a Shavney Posture Key—a brass code key on a handsome specially designed base. Code sheet included. Check black, white, or grey and send payment to Shavney Imports Inc., 111 South Easton Road, Glenside, PA 19038. Ppd \$12.95. A great gift idea!

SPECIAL-100 QSL IRC's-Only \$2.00. Swaney-SBZ, 2889 Chestnut Grove, Austell, GA 30001.

DEMCO SUPER SATELLITE; Trans., Rec., Spkr. modulator, foot sq., D104; \$500, C. Washburn, Rt. 2, Gray, GA 31032.

SILTRONIX 1011D 10 METER AMATEUR TRANSCEIVER WITH 11 METER (CB) "RECEIVER." AM 60 watts input, SSB 300 watts input. 8 months old, EXCELLENT CONDITION. ANL, AGC, VFO, complete with frequency meter, microphone, external speaker, and phone patch. Worth over \$875, sell \$750. For details write: Mark, Box 6157, Ventura, CA 93003.

CB ANTENNA CONSTRUCTION MANUAL: Tenna-Farm's manual contains complete plans with detailed pictorials to build high performance verticals, groundplanes, quads, beams, and stacked beams with 15 DB gain. One trip to your local hardware or electrical store supplies you with all materials needed. You save 80% -we guide you in material selection thru to final tuning. For complete manual send \$3 cash, check or mo. to: Tenna-Farm, 117 Dewitt Terrace, Linden, N.J. 07036.

QSL 100 PERCENT-Buddy Packs-KAIX-2794 P.O. Box 249, Ridgewood Station, Brooklyn, NY 11227.

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CHRISTMAS GIFT- Custom engraved desk set. Silver with two pens. 2x8" engraved black or walnut front. Your choice. Top line reads-"Emergency CB two-way radio station"- your name, call sign, handle engraved below. Only \$11.75 PPD to our good buddies-The Elbridge Engraver, Elbridge, NY 13060.

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, NC 27292.

SSBers! Get your LV Numbers for SSB. Join the Laughery Valley SSB Club. Roster and Membership Cert. all for \$2.00. Write LV1, P.O. Box 4, Osgood, IND 47037.

SECRET SCANNER FREQUENCIES. Directory lists 1300 federal government channels used by FBI Secret Service, Customs Etc. Bearcat 101 programs for 700 channels not in owners manual, including federal government channels. \$5.00 each publication. Blakeman Electronics, Box 288, Dupont, Colorado 80024.

YOUR CALL SIGN OR NAME OR INITIALS engraved on distinctive clear lucite key ring. Great holiday gift. Two styles: 1" x 2-3/4" 8 character max \$4.50; 1-1/2" x 5" 14 character max \$5.50. Action Products, Box 89, Reisterstown, MD 21136.

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BEST PRICES— Johnson, SBE, Courier, Midland, Antenna Specialist, Avanti, Astatic, Turner, Mura, etc. Free Price List, CRS COMMUNICATIONS, 1552 Central Park Ave. Yonkers, N.Y. 10710.

BELOW OUR COST SALE. Hy-Gain 40 channel mobiles, model 2681, \$77.49, model 2682, \$97.49. Free UPS and model 590 fold-over antenna. Other Hy-Gain mobile antennas 50% off. Cartwright Communications. Phone Toll Free 800/543-8614.

CB RADIOS, VHF/UHF monitors, crystals, antennas. All brands. Lowest pricing possible. Southland, PO Box 3591-F, Baytown, Texas 77520.

SIDEBAND DECALS! Tell the world that Sideband is the greatest! Spectacular new 3-1/2 inch 3-color water transfer Sideband decals! One decal only \$1.25 ppd! Two or more only \$1, ea., ppd. Dealers wanted! Sidebander's Service Bureau, Box 381-Y, Smithtown, NY 11781.

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SIDEBANDERS! Old Timers! Newcomers! Future Sidebanders! Affiliate with the largest, oldest and most well known SSB Network! No charge for SSB ID numbers from current numbering blocks. Lots of extras and goodies available! Send self-addressed stamped envelope for FREE info and application. No Obligation! Sidebanders' Service Bureau, P.O. Box 381-X, Smithtown, NY 11787.

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SECRET SCANNER FREQUENCIES? Many public safety and federal gov't agency frequencies are "unlisted"--that is, "missing" from frequency listing available to the general over-the-counter buyer! What good is a scanner without ALL of the frequency data? Get those unlisted frequencies and lots more ONLY in CRB Research directories, the original Official "insiders" directories used by public safety agencies and scanner users since 1967! Exclusive directories for many other services (mobile telephone/private detectives/aero/railroad/remote broadcast pickup/etc.) also available! Still ONLY \$3 each, or send a postage stamp for fantastic BIG new catalog! CRB Research Inc., P.O. Box 56-X Commack NY 11725.

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COAX RG8/U 500 ft. \$96.00 Polyethylene Dielectric. Dennis Bird, 2307 North Benson Rd., Fairfield, CT 06430. 203-255-0812.

HIGH AND LOW CHANNEL CRYSTALS for all synthesized CB sets. Monitor crystals, too. Send 25 cents (coin) for catalog and price sheets on other hard-to-find CB accessories, or call 612-784-1840 for fast service. FBCO, 2928 14th St. N.W., New Brighton, MN 55112.

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MAIL-IN CB REPAIR: Write or call for procedures and flat-rate price schedule. AM repair \$17.75 plus parts, SSB repair \$22.25 plus parts. Most radios in return mail within 48 hours. Warranty service for most CB manufacturers. COMMUNICATIONS UNLIMITED, P.O. Box 55, I-70 & US 42, London, Ohio 43140. (614) 852-9446.

AGENT'S WANTED! Sell Engraved Metal CB Plates. Big Profits! Details Free! SJP & Co., Box 3127A, Wallington, NJ 07057.

TRAM DISTRIBUTORS- Buy from distributor with D201's in stock. Tax no. for prices. Briggs-Morris, P.O. Box 32335, Louisville, KY 40232. Phone: 502/451-0901

CB SYNTHESIZED CRYSTALS- Dealers and Repairmen only. Phone or write for our list of H.F. and L.F. Crystals. In stock now for immediate delivery. (S-E Crystal Dept., Rt. 2 Box 375, Hillsboro, MO. 63050. Ph. 314-789-2683.

FOR SALE: Cobra Cam 88, in good condition, \$150.00. Orlan Cain, Rt. 2, Griswold, IA 51535.

CB HAM DEALER: Send your letterhead for free catalog. SILTRONIX, MIDLAND, PEARCE-SIMPSON, D&A, BLACK CAT, HUSTLER, AVANTI, etc. Appliance & Equipment Company, Inc., 2317 Vance Jackson, San Antonio, TX 78213. Ph. 1-512-734-7793.

SEEKING ORIGINAL JAPANESE TRANSISTORS FOR CB REPAIR! Request complete list. Compare 1 to 9 prices: 2SC710 .59, 2SC517 3.95, 2SC799 3.60, 2SC1306 4.40, 2SC1678 2.25, TA7205P 3.90, BA521 3.70, BA511 3.40. Fuji-Svea Enterprise, Dept. S, P.O. Box 40325, Cincinnati, OH 45240.

EMPLOYMENT INFORMATION: Have you caught Rocky Mountain Fever? Do you long to live and work in an unspoiled, pollution-free environment? We have the cure: Weekly employment opportunity newsletters for Colorado, Idaho, Montana and Wyoming. Write for free details to Intermountain-V12, 3650 Upland, Boise, Idaho 83705.

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ATTENTION BROWNING LTD, TRAM D-60 and COBRA 132-135 OWNERS. Take advantage of our new low prices on channel expansion kits. 23 additional channels (Kit UR-1) only \$17.95. 46 more channels (Kits UR-1 & UR-2) only \$29.95. Send check or money order or request free descriptive brochure. FBCO 2928-14th st. N.W., New Brighton, MN 55112.

NATIONAL CHRISTIAN CB CLUB FORMING. Find hundreds of new friends, service opportunities. Make travelling time count. Invites all John 3:16ers to join. Great opportunity, Luke 10:1; 1 Corinthians 9:22 & 16:9. Send stamp: Christian CB Club- Box 21611, Concord, CA 94521.

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DEALERS- Looking for low prices, freight-paid policy and doing business with a firm that gives you quick, personal service--Give us a try! Antenna Specialists, Astatic, CDE, Pearce-Simpson, Midland, Turner, Hustler, Van Ordt, Consolidated Towers, and others--Send letterhead for free catalog. SUGAR SHAK DISTRIBUTORS, 1025 N. King St., Hampton, VA 23669. Ph. 804-723-7024.

LOOKING FOR old Lionel trains. Interested only in "O" Gauge, excellent to like-new condition. Primary interest is locomotives prior to 1952, but will consider complete sets or more recent models. Am willing to buy outright for cash or swap radio gear to meet your needs. Write: Dick Cowan, WA2LRO, c/o S9 Magazine, or Call 516-883-6200.

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NASSAU COUNTY CB'ERS: Don't sit back... Join REACT!! Central Nassau County REACT, one of the first and largest teams in the nation would like you as a member. We are an independent, non-profit volunteer public service team dedicated to aiding you, our fellow CB'er in time of need. Send today for more information and a membership application to: Central Nassau County REACT, P.O. Box 406-S, Westbury, NY 11590.

WANT TO BUY: Will pay top dollars--hard cash---for old Lionel Trolleys in any condition. Also want old Lionel or Ives Standard Gauge trains. Your old clunker may be a collector's dream. Don't be bashful. Write Dick Cowan, c/o S9 Magazine, 14 Vanderverter Ave. Port Washington, NY 11050. Phone: 516 883-6200.

SCANNER CRYSTALS from America's leading supplier-- sent to you postpaid and factory fresh from an inventory stock of 100,000 crystals! \$3.95 for multiple orders! Send postage stamp for free catalog and special order form! Z-Tech Enterprises P.O. Box 70-A, Hauppauge, NY 11787.

PROTECT GEAR with bold burglar alarm warning stickers. Strong self-stick vinyl striking green/yellow design. Only \$2 for 5. Enclose self-addressed stamped envelope. CRB Research, Inc., P.O. Box 56-XC, Commack, NY 11725.

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QSL 100%? Join the Carnival QSL Club of the world. Membership \$3.50. Includes 8 1/2 x 11 certificate, your C.C.W unit number & wallet size ID Card. Write for ; Application Blanks, 1124 High Bluff, Dubuque, IA 52001.

QSL CARDS? Want to have QSL cards from all over the world? Write for application blanks, Chris Huston ,Carnival QSL Club, 1124 High Bluff, Dubuque, IA 52001.

BROWNING LTD 23 ch. SSB CB radio. Brand new in box \$200.00. Browning Golden Eagle MK 3 transmitter and mike only. Excellent condition \$275.00. M Cummings, P.O. Box 12, Foxboro, MA 02035.

"NEW" MUST SELL. Wilson "shooting star" 8 element beam \$130.00. Kraco AM/SSB 23 channel mobile CB \$99.00. CD Ham II \$130. F. Williams, 12 Clintonville Rd., Northford, CT 06472.

FOR SALE- Siltronix 10-11 and Swann 1200 amp also Vox for 10-11 B. Price: \$555.00. John H. Joiner, Jr., 5510 River Forest, Jacksonville, Florida 32211

WANTED: Hammerlund Hq 105-good working condition with or without CB crystals. John Joiner, Jr., 5510 River Forest Dr., Jacksonville, Fla. 32211

UNIVERSAL QSL and DX cards needed. Send QSL and DX cards to Philip Kurland, 357 East 201 St., Apt. 1-F, Bronx, NY 10458

CB RADIOS AT WHOLESALE PRICES! Listing 50 cts. Going Ham? YAESU FT-101E in stock. SIDEBAND SPECIALTY, Box 573EF Oak Harbor, WA 98277

NOVICE SPECIAL! The "Double D", Ham Antenna work the world, out-performed in all comparative testing. Installs in minutes, VSWR 1:1 easily obtainable. Tunable to any band. Reg. \$59.95. ONLY \$36.95. Yaesu FT-101's available too! Complete listing 50 cts. Sideband Specialty, Box 573-Q, Oak Harbor, WA 98277

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CB CRYSTALS: Available now high, low and R/C frequencies. Dealers welcome. For information write or call: Robert Morgan, P.O. Box 194, Suisun, CA 94585. (707) 425-7873.

QSL TRADERS WANTED. Send your card and large stamped envelope to: Julie Swancey 2889 Chestnut Grove, Austell GA 30001.

COLLECTING QSL CARDS? Will send same to all who sends me theirs. Blue Echo 181, P.O. Box 571, Dunkirk, NY 14048.

HOW TO CONVERT YOUR 23 CHANNEL RADIO TO 40 CHANNELS. Also how to get more modulation from Midland D104 Combinations. Send \$1.00 and self-addressed stamped envelope. Specify radio. Larry Beard, 255 Eagle, Memphis, Tenn 38118

WANTED- 40 channel CB, Test Equipment, Ham Gear, etc. Have goodies to trade. Mike Gauthier, WB7QGR, 9550 Gallatin Rd, Downey CA 90240, Tele: 213-923-0131

WANTED- Johnson CB Radios' in good condition. State price and condition. Send to Johnson/NHRA, P.O. Box 1320, York, PA 17405

NEW MODEL ASTATIC MIC MODEL 1104C beige color, \$45.95 prepaid. Brand new with the factory warranty. Earl Etter, RT 3, Jerome, Ida. 83338

30 WATT TUBE TYPE STEREO AMPLIFIER IN GOOD CONDITION. \$25 plus shipping. Lafayette Model KT-630. Loren Schaeffer, RRI Box 61, Winthrop, MN 55396

Introducing HANDLE-LITE™ by TOPPER

Lets people find you even in "Heavy Traffic"

CALIFORNIA HIGHWAY PATROL APPROVED

Handle-Lite should be standard equipment for every CB'er. Handle-Lite makes CB communication fun again. Handle-Lite lets your good buddies on the road tell at a glance:

- When you've got your ears on
- What your handle is
- And what channel you're modulating on.

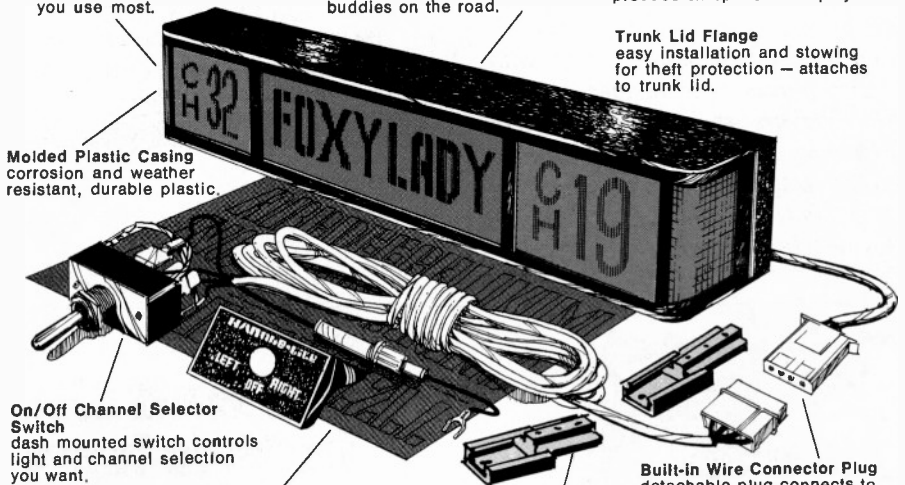
Large 3 3/4" x 2 1/4" Channel Read Out bright orange lens lights up to display the two channels you use most.

Big 8 1/2" x 2 1/4" Handle Display bright blue lens lights up to beam your handle to good buddies on the road.

4 Light Bulbs
4 high intensity lights produce sharp visual display.

Trunk Lid Flange
easy installation and stowing for theft protection - attaches to trunk lid.

Molded Plastic Casing
corrosion and weather resistant, durable plastic.



On/Off Channel Selector Switch
dash mounted switch controls light and channel selection you want.

Vinyl Decals
full set of numbers and letters apply to mylar sheets, behind lenses, inside casing.

Mounting Bracket
easy to install bracket for attaching Handle-Lite to campers, trucks and pick-ups.

Built-in Wire Connector Plug
detachable plug connects to wire running to dash from Handle-Lite unit.

SPECIAL INTRODUCTORY OFFER TO CB'ERS Get your complete assembled Handle-Lite unit and start having fun again with your good buddies on the open road for **ONLY \$24.95** (Including shipping).

Let your good buddies find you in "Heavy Traffic." Order your HANDLE-LITE™ by Topper today. Makes a great gift too.

Please send _____ HANDLE-LITE units @ \$24.95 each. (California residents add 6% sales tax)

Enclosed is:

CHECK MONEY ORDER OR CHARGE TO MY:
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CREDIT CARD # _____ EXP. DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

MAIL ORDER TO: TOPPER MANUFACTURING CORP.

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TORRANCE, CA. 90501

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 \$50.00 each insertion prepaid by check, money order or through Bank Americard (Visa) or Master Charge by indicating account and interbank numbers and expiration date with signed request. For further information dealers should contact Herb Pressman, Advertising Sales, CB Radio/S9 Magazine, 14 Vanderverter Ave., Port Washington, NY 11050. Phone 516-883-6200.

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AT BOTTOM OF THE LINE PRICES
QUALITY LINE ELECTRONICS INC.
Transit Town Plaza
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716-631-3332
RETAIL WHOLESALE



Who had the front door in this here convoy?



Our good buddy in the 18-wheeler's got trouble but this colorful wall plaque will provide a chuckle for all the CBers on your Christmas gift list. And for yourself, for sure.

The full color plaque is made of durable cast aluminum and measures 23" x 9". The smokey in the chopper is 6" square.

The bright, rich colors on your "She's clean 'an green. Hammer Down" plaque makes it ideal for hanging in den, office, children's room or anyplace you want to brighten the decor.

**ORDER YOUR PLAQUES TODAY.
ALL ORDERS SHIPPED WITHIN 48
HOURS OF RECEIPT. PLAQUE
GUARANTEED. MONEY BACK IF
NOT COMPLETELY SATISFIED.
\$20.95 PLUS \$3.00 FOR SHIPPING
AND HANDLING.**

Mar Lee Decor/P.O. Box 554/Addison, Texas 75001

Please send _____ Clean 'an Green. Hammer Down!
Plaque(s) at \$20.95 ea. plus \$3.00 ea. for shipping and
handling to:

Name _____

Address _____

City _____ State _____ Zip _____

Total amount enclosed \$_____. Check _____ Money Order _____

Texas residents add 5% sales tax.

Now you're talking!

High performance plus quick assembly... that's what Channel Master Base Station CB Antennas are all about.

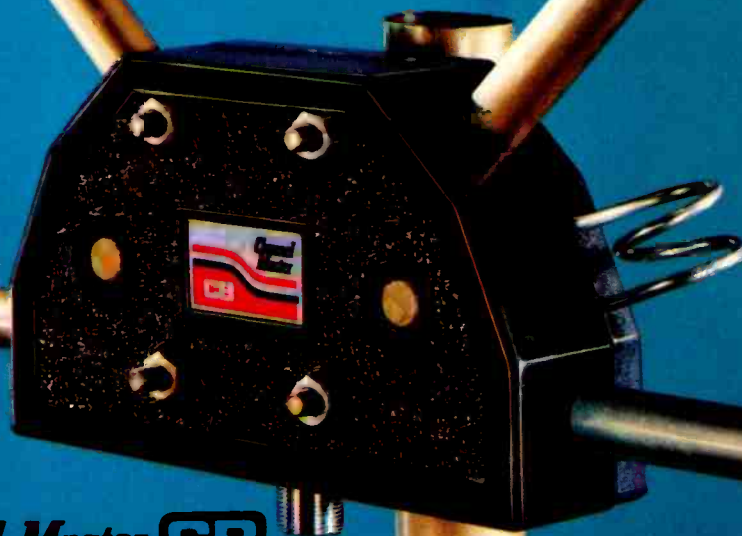
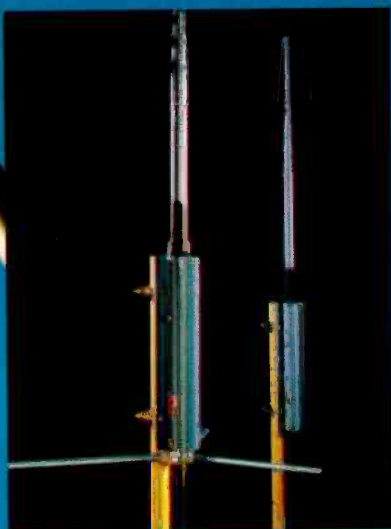
Now there are five exciting models to choose from....each offers excellent CB performance and years of power-packed operation.

- **OMEGA**....our newest and most versatile CB antenna. Can be mounted above OR below TV antenna, on its own individual mast, or in the attic! Delivers great omni-directional CB performance 4 ways. 4 dB gain. Sug. Retail: \$34.95
- **QUARTER MASTER**...An economy-priced, full size, ¼ wave, quick-assembling antenna that delivers plenty of performance. Sug. Retail: \$19.95
- **GOLDEN HAWK**....a powerful, 1/2 wave, omni-directional antenna that assembles in less than 60 seconds. 5 dB gain. Sug. Retail: \$49.95
- **SKY MASTER**....Our largest colinear, 5/8 wave....really gets the message out! 5 dB gain. Sug. Retail: \$49.95
- **SKY PROBE**....a strong, 1/2 wave, colinear designed for optimum efficiency. 4 dB gain. Sug. Retail: \$39.95

CHANNEL MASTER BASE STATION CB ANTENNAS
...Now make your home 20 a CB Power House!

Channel Master **CB**

Division of Avnet, Inc.
S-91277, Ellenville, New York 12428



Shakespeare's Big StickTM Antenna. World famous performance. And right in your own backyard

Punch out the big signal from 60 feet up with Shakespeare's Big Stick. The omnidirectional fiberglass base station antenna that outperforms anything on the 40 channel band. Illuminating 12 times more capture area. And sending the signal energy out to the horizon in a unique, low angle radiation pattern.

This half-wave coaxial sleeve antenna incorporates exclusive Shakespeare engineering in fiberglass to outrange taller, heavier metal antennas under all conditions. Withstanding ice and winds up to 125 MPH with no damage to reception. And pretuned to a low SWR over the 40 channel band.

Move up for the big gain with Shakespeare's Big Stick. Pretested. No ground radials. Works anywhere with any length of cable. Also available in a low cost, 2-piece model, Big Stick II.

Shakespeare



The best antenna going. And coming.

Big Stick, Style 176
Used as part of this country's DEW
line defense system. Less than \$45.

Shakespeare Company, Antenna
Group, P.O. Box 245,
Columbia, S.C. 29202
In Canada:
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Ontario.



WALKING TALL WITH THE PALOMAR 40'S.

Palomar Electronics' new 40-channel 2-way radios are designed to give you maximum performance in every phase of operation.

Unique phase-lock synthesizers guarantees a bodacious signal. Adjacent channel rejection of more than

50 db ensures against splashover. Their Spurious Harmonic Rejection features effectively eliminate TVI.

**HERE
COME THE
40'S**

And the futuristic Digital Display Channel Indicator plus the crisp, clean compact design lets everyone know that when it comes to quality, there can be no compromise.

With the Palomar 40's you're always walkin' tall, wall-to-wall and tree-top tall.

Palomar 4100 now FCC approved.



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'We're Wired for Progress'

665 Opper Street • Escondido, Calif. 92025 • Telephone (714) 746-2666

In Canada available at Paltronix Distributors, 5940F No. 2 Road, Richmond, B.C., Canada V7C 4R9

Palomar Digital 400 has not been approved by the Federal Communications Commission.

This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained.

The Touch by Regency is the first fully synthesized, 16 channel scanner to put over 15,000 radio frequencies at the command of a fingertip.

It not only opens you up to a whole new world of action, it gives you plenty of features to play with as well.

For example, The Touch will never allow you to miss a severe weather warning. No matter what frequency you're tuned to. Simply set Channel 16 to the National Weather Service alert mode, if available in your

area. The Touch automatically cuts into any severe weather broadcast.

In other words, it'll interrupt a raging fire to bring you news of a threatening tornado.

Here's another overriding feature. The Touch lets you set up Channel 1 as a priority receiver; and it samples that frequency every 1.2 seconds. So you won't miss any calls on your favorite channel.

Other points: there's no complicated programming to do. No crystals to buy. Simply

tap out the frequency number you want, and you're there.

Or scan for action on your 16 possible stored frequencies by merely touching SC. Or search for the unknown by tapping SS. It's that easy.

And when you find new action, The Touch tells you exactly what you've found in the LED display.

The Touch by Regency. See it at your dealer's.

**The Touch by Regency.
The Ultimate Scanner.**



**It can interrupt
a thrilling fire to bring you
a frightening tornado.**

ADVERTISER'S INDEX

Reader Service System

To speed information to you on products shown in S9 advertising a new computerized Reader Service system has been designed. For additional information on a particular ad in this issue, tear out the Reader Service postcard bound between pages 128 and 129, and circle the numbers on the card which correspond with the Reader Service numbers listed in the advertiser's index below. **DON'T CIRCLE THE PAGE NUMBERS!** Fill in your name and address, and mail. We'll have your information on the way in short order.

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BUYER BEWARE!

The publisher of S9 accepts advertising from manufacturers, dealers and distributors who, in our opinion, offer readers a high level of quality in products and/or service. Wherever possible we attempt to publish additional information on these products in the form of technical equipment evaluation reports.

We wish to remind our readers that we carefully screen all potential advertisers. In the event that a company's products do not appear within our advertising pages, there's a strong likelihood that it has not passed our minimum standards.

We strongly urge readers to purchase from those companies whose advertising appears in S9; by doing so, you will be assured that the company with whom you're doing business is a reputable one. You'll also be supporting those companies that help make S9 possible. Now, we recognize that many advertisers cannot advertise in every issue. If you don't see the company's ad in the current issue, check back two or three issues to be certain, since almost every major advertiser appears six or more times in one year. If you have doubts about the reliability of any particular product or company, feel free to contact our publisher for information. This service is offered as a safeguard to our readers.



Discover a New Frontier in Personal Communications...

Introducing the A.R.F. 2001

Unique engineering contributions have established the A.R.F. 2001 in a class by itself.

7,500 transistors—24 integrated circuits, an equivalent of 7,500 transistors, creates an entirely new computer controlled CB Base Station.

IN THE TRANSMITTER—

SAM—Solid State Servo Amplitude Modulator—More than ten times the effective talk power of a conventional CB transmitter.

INTERFERENCE—A built-in 7-pole Elliptic filter suppresses television interfering signals. Your neighbor won't know you are on the air.

IN THE RECEIVER—

AMSIL—AM Silencing. While operating on side-band the AM signals may be squelched. You only hear the SSB Stations.

SELECTIVITY—A Dual IF amplifier incorporates two eight pole monolytic quartz filters, one for AM reception and an independent one for SSB reception, maximizing performance in both modes. The best of both worlds.

DUAL GATE MOS-FET RECEIVER—Engineered for high level signal handling, the receiver prevents desensitization from strong adjacent channels for unparalleled reception.

DELAYED AGC SYSTEM—This feature prevents deterioration of the receiver's noise figure at its sensitivity threshold for clearest reception from even the most distant transmitters. The best ears in town.

IN THE SYNTHESIZER...

COMPUTER PROCESSOR—Featuring a multiple function keyboard entry system. The A.R.F. 2001's built-in memory provides for ten pre-

selectable channels which can be scanned automatically as a search receiver to read the mail. In the monitor mode, any channel selected may be monitored every eleven seconds.

AUTOMATIC SCANNING FUNCTIONS—An automatic busy and open channel scan capability provides an automatic search for either an open or busy channel. Fast or slow scanning through all forty channels is a standard feature as is automatic monitoring of the recall channel.

OTHER FUNCTIONS—The A.R.F. 2001 also includes an ANTENNA SELECTOR SWITCH, LED CLOCK, PEAK INDICATING POWER/SRF METER, MODULATION METER, LAMP DIMMER, and a NOISE BLANKER as well as TALK BACK, PA EXTERNAL SPEAKER, TONE CONTROL, and STUDIO MODE INDICATOR. No expense has been spared in design and construction of the A.R.F. 2001.

The A.R.F. 2001 is designed and manufactured in the U.S.A. by A.R.F. Products, Inc., an American company founded in 1942, which pioneered in the development of ground and missileborne communications equipment for the military. A.R.F. brings thirty-five years of research and development experience to the creation and precision engineering of the A.R.F. 2001...the finest personal communications system available today. Ask your local CB dealer about the A.R.F. 2001 or contact the factory.



A.R.F. Products, Inc.
Gardner Food
Raton, New Mexico 87740
(505) 445-3666

Patent Pending

**AMERICA'S
FAVORITE**

Wilson

Model antenna
not to scale

Specifications

Gain: 14 dE over isotropic
Front-to-Back Separation: 38 dB
VSWR: 1.1 to 1, SWR adjustable
Vertical-to-Horizontal Separation: 20/25 dB
Power Handling Capability: 2 kW
Power Multiplication: 28 times
Bandwidth: Less than 1.5 to 1 over all 40 channels
Windload Area: 6 square feet
Boom Length: 16 feet
Longest Element: 18 feet
Weight: 28 pounds
Recommended Rotor: Wilson WR-500
Recommended Tower: A I Wilson towers
Quad Element: Fiberglass insulation

CB and Amateur Dealers Wanted.
New Dealers are needed for many areas of
the country. If you are interested, please
contact us.



To complete your antenna system, use
Wilson's crankup towers
and rotors.

8-Element Shooting Star

Directional, Dual Polarity, Yagi-Quad
CB Base Station Antenna with DPE*

When size or economics are your main consideration, consider the 8-element Shooting Star with DPE*. Developed to fill the need for top performance, dual polarity operation at an economical price, the Shooting Star has a gain of 14 dB. That's like broadcasting with 28 times your normal power!

The design uses a 16-foot boom with six scientifically-spaced 18 foot elements and a quad reflector to obtain the best combination of gain and front-to-back ratio. It's the same design used to bounce signals off the moon!

Using the same construction as the famous Wilson Laser beams, with heavy-wall aircraft-type aluminum tubing and Wilson's special extruded element clamps, the Shooting Star's mechanical construction is superior to other like antennas. And, it has the Wilson 2 kW power handling capability!

**You can locate any of America's favorite
Wilson CB products at better dealers nationwide.**

*Dual Parasitic Excitation field. DPE allows less energy to escape out the back or sides of the antenna.



Wilson Electronics Corp.

4288 S. Polaris Ave, P.O. Box 19000, Las Vegas, Nevada 89119
Phone 702-739-1931 • TELEX 684-522

NEW IMPROVED AVANTI® PDL II™ CB BASE ANTENNA

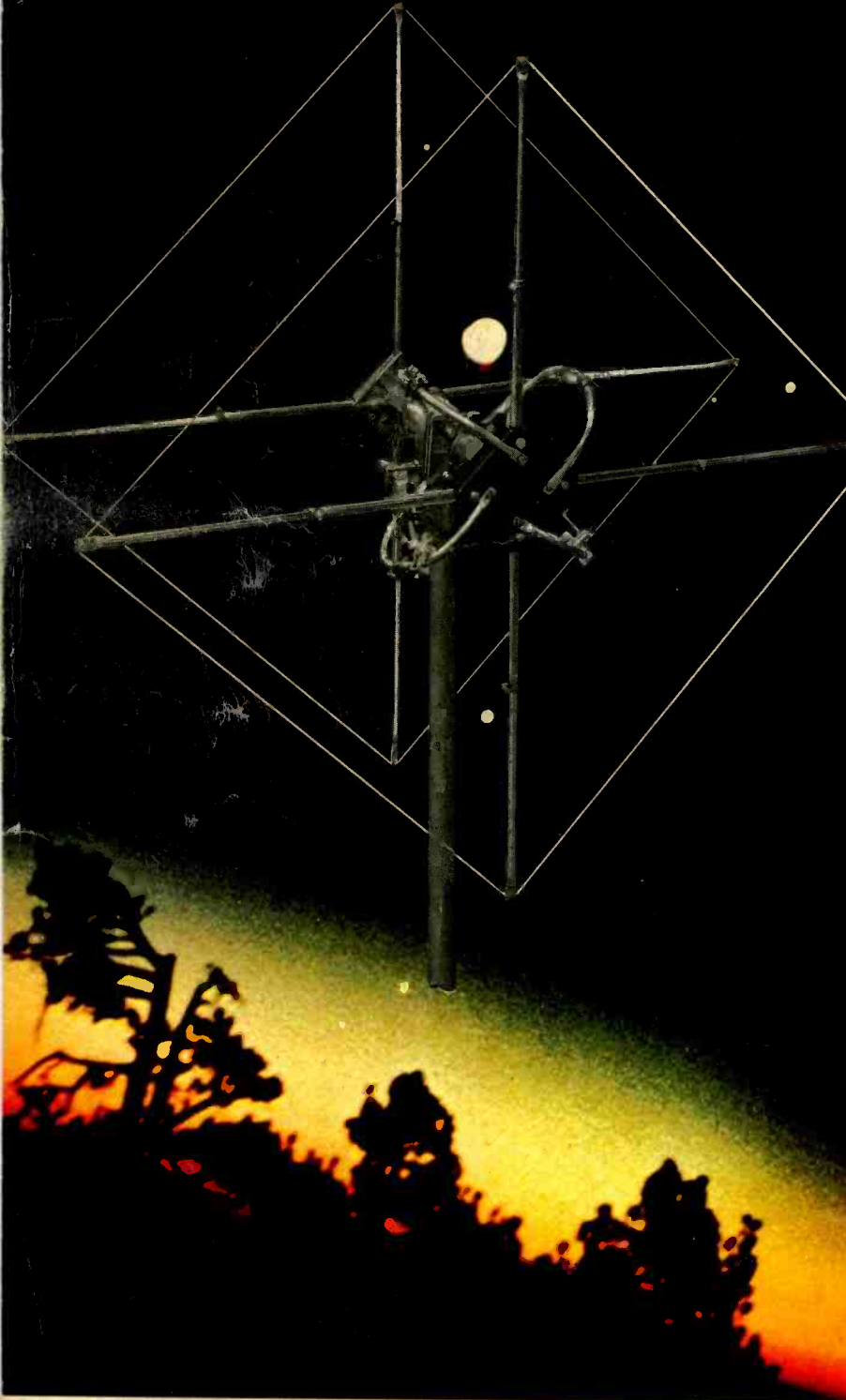


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16x more power to you with a **CO-INDUCTIVE** design and an orbital gamma match

More Gain because this system of creating an impedance match is higher in "Q" and lower loss than previous matching devices and acts to increase radiation.

Better reception with increased efficiency through use of orbital gamma match.

Better rejection front-to-back separation is 32 db.

Burn-out proof. The PDL has no coils or transformers to burn-out or detune. D.C. ground construction offers better lightning protection than any commercially available lightning protectors.

Compact construction. New cast aluminum rear hub. New fiberglass filled high impact ABS front hub. New swaged joints on orbital gamma match plus cadmium plated parts and bolts, stainless steel clamps, aircraft quality heavy duty tubing for strong, low weight, long lasting construction.

SPECIFICATIONS — PDL II Model AV-122

Forward Gain	12 db over standard reference isotropic
Band Width	Full 40 Channels
Front-to-back ratio	32 db
Polarity Isolation	23 db Vertical to Horizontal
VSWR	1.2:1
Switch Box Included	Low VSWR co-axial change-over to effect switching horizontal to vertical.
Impedance	50-52 ohms
Directional Beam	Light or Medium duty rotor
Lightning Protection	D.C. Ground
Power Multiplication	16x
Wind Load Area	2.0 sq. ft.
Stacking kit available	

high performance **CO-INDUCTIVE**™ antennas

Avanti makes a complete line of high performance mobile CB antennas and accessories. For free catalog, write:

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