

# CB RADIO

AMERICA'S OLDEST AND LARGEST CB MAGAZINE

July 1977

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*This month's cover is by noted illustrator Albert J. Pucci,  
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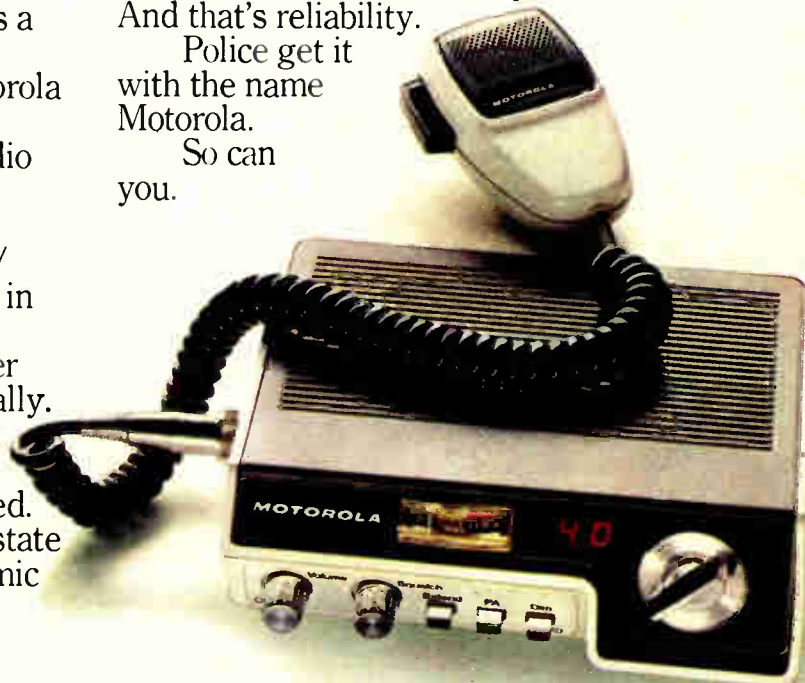
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# CB Newswire

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## Two Wheeler

By MSgt. Jim Mims

"Break-12 for that two wheeler peddling south on 17," bellows a deep husky voice with a southern drawl . . . peddling is correct for Sergeant John Henry McCoy, Jr., who makes the trip from the Marine Corps Air Station, New River, south of Jacksonville to his residence about two miles south of the main gate on US 17, via bicycle.

While it isn't uncommon to see cyclists maneuvering through traffic these days this is the first encounter of a two wheeler sporting a mobile CB, complete with antenna and mike, ever seen in these parts.

"The idea is mine," commented Sgt. McCoy, metalsmith, assigned to Marine Heavy Helicopter Squadron (HMH)-461, "but everyone in the shop has contributed to putting the plan into operation."

His basic ingredients include a "Free Spirit" 10-speed bike, a "Realistic" six channel CB, a 12 volt motorcycle battery and the necessary hardware to mount his equipment.

Using a gutter mount antenna, modified to fit the bike's rear sprocket, the unit is capable of putting out about six miles. The CB is mounted on a specially designed bracket attached to the handlebar of the bike.

Steering and modulating has proven to be a bit of a task for the rider, reports McCoy. However, he hopes that in time experience will overcome this problem.

His only other complaint is the battery . . . there is presently no way of hooking up a generator capable of recharging the battery, but the young Marine and his peers are busy drafting plans and using the trial and error method of seeking a solution.

So if you happen to be traveling along US 17 and come upon a two

wheeler, pick up the ole mike and ask for KSX-6404, The Mad Irishman on Channel 12.



**TWO WHEELER**—The Mad Irishman KSX-6404, Sgt. John Henry McCoy, a metalsmith in Marine Heavy Helicopter Squadron (HMH)-461 pauses on the flight line at the Marine Corps Air Station, New River to communicate with a fellow CBer. The Marine and CB buff pieced together the necessary component to mount a six channel CB on the handlebar of his 10 speed bike. (Official USMC photo by Sgt. Joe Blackburn)

## Man, Youth Killed Erecting CB Antenna In Kentucky

A man and a boy were electrocuted as they tried to install a CB radio antenna near Independence, Ky. The dead are Joseph Paul Rice, 33, and William R. Anderson, 14.

They were pronounced dead at St. Luke Hospital by Kenton County Coroner Robert Reichart.

Reichart said the victims came in contact with a high tension wire while installing a CB antenna at a neighbor's home.

## Big CB Tower Stolen In Mich.

A Madison Heights man told police that someone took a 60-foot high CB radio tower, anchored in three-feet of dirt outside his home.

Joseph Ritchey, said someone cut the supporting guy wires and pulled it out of the ground.

## York, Pa. Police Listen On CB For Emergency Calls

City police began monitoring Channel 9 making York one of the first cities in Pennsylvania to listen in on messages broadcast over the channel reserved for emergencies.

William Follmer, the city's crime prevention coordinator, said the transceiver, which enables the desk officer to communicate directly with the CB operator reporting an emergency, the antenna and coaxial cable were purchased with \$250 in allotted funds through the federal Law Enforcement Assistance Agency in conjunction with the Governor's Justice Commission.

Follmer said the CB base set was purchased by the city as part of the police department's overall crime prevention program. He said citizens now are using radio communications so broadly that police, in many instances, can be alerted to emergency situations more rapidly than by the traditional telephone method.

Manned 24 hours daily inside the desk officer's room, next to the city police radio room at city hall annex, Follmer said city police only will acknowledge messages from registered volunteer CB operators who will be assigned unit numbers in an effort to avoid the problem of false calls.

Special training is planned for the volunteer operators which, Follmer said, already total 250 in number. They are people who, at various times around the clock, monitor at their homes or places of business the Channel 9 activity.

Examples of the type of calls police hope to receive over the CB monitor set are crimes in progress, serious traffic accidents with injuries, other kinds of personal emergencies involving stricken individuals and fires.

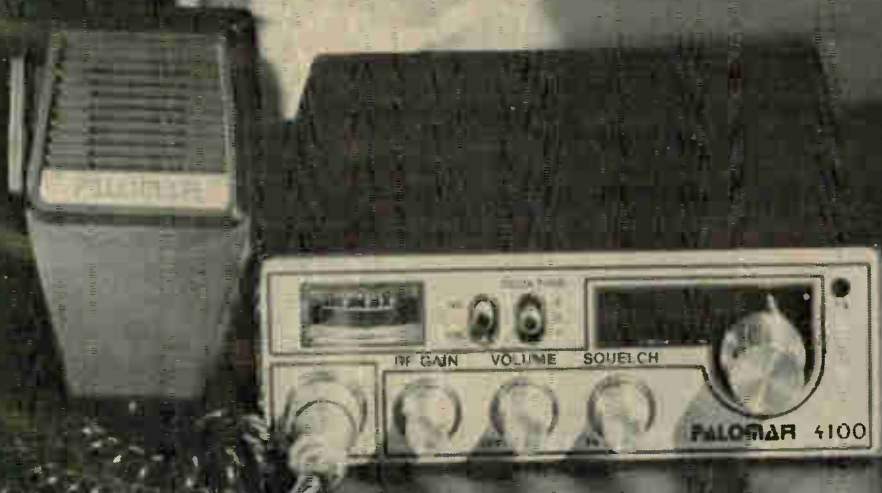
Follmer said in order to keep the air waves clear for real emergencies, informers will be instructed not to use Channel 9 to report minor "fender bender" accidents where no personal injury is involved, traffic lights that are burned out or stop and route or directional signs that are bent or missing.

Such police-related activity will be handled, as in the past, Follmer explained, either by discovery while officers are on patrol or by telephone reports from citizens.

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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## THE TEXAS BED BUG—10-4!

What's a man who is paralyzed from the neck down doing with a CB radio?

About the same thing as many other good buddies. Mostly just talking and making friends and occasionally helping someone to feel more chipper about things.

Jim Echols of Austin, who is 42 and has been bedridden because of polio since he was 24, figures it this way:

"I suppose me talking to people does cheer 'em up," he said from his bed, the one rigged up with the CB equipment.

"There's the guy working eight hours a day, wife on his back, then he talks to the old *Bed Bug* (that's Echols' handle) and I suppose that's got to make him feel better."

That, said Nell Schnur of Austin, who raps with Echols now and again on CB Channel 8, is a big 10-4.

Schnur, too, is bedridden. She has a blood clot, and she'll be stuck in bed for a few more months.

She was finding it hard to cope with that situation—until she talked with the *Bed Bug* on the CB.

"The adjustment was very difficult," she said, "but one Sunday morning he talked to me for about an hour and just changed my whole attitude."

That's easy to figure after talking with the man, who substitutes a sense of humor for self-pity.

He has none of the latter.

"I can see the headline now," he said sarcastically. 'Poor wretched cripple is saved by a life of CB.'

"I think there's humor in any situation, even my own. I make light of it all the time. Without humor, life is hardly worth living."

One day in 1959, Jim Echols was water skiing. He had not had a polio vaccination. The next day he was very sick. It felt like a bad case of the flu, he said. He saw a doctor, who sent him to the hospital.

Echols checked in under his own steam, then went to his room. That was on a Sunday.

"That's the last I remember until Tuesday morning," he said. "I woke up gasping for breath and paralyzed from the neck down."

All of which has kept him from walking, but not as much else as you'd expect.

The man types about 20 words a minute via a stick that has a plastic mouthpiece on it. He puts the stick in his mouth and hunts and pecks with his head. Some of his writings have been published in metaphysical journals.

The writing is done on rolls of paper.

"Some of my letters have been five feet long," he said. "I'm wordy."

Then there's the CB. He calls the setup that sits on his bed the *Flea Bag Base*. His wife Cindy, alias the *Lady Bug* and a nursing student, put it together.

On one side—the left—is a list of CB radio codes. In the middle are a book stand and the CB radio. On the right are the CB speaker, a remote control television channel changer, a device that can increase the range of the CB, a control that raises or lowers his bed, a microphone amplifier.

Echols turns all that either on or off with the stick and the use of his mouth.

The CB mike is attached to a bracket that is bolted to his chest respirator, the one that helps him breathe. Breath is no longer as involuntary an activity as it used to be.

The gadgets create a cockpit effect, Echols says, and the noise of the respirator causes one humorous problem.

"For instance," he said, "I've had people

break into conversations and say, 'Pardon me, but it sounds like you're in a submarine.'

"Sometimes I tell them I'm Captain Nemo."

And other times Echols talks CB talk all night.

"Since my wife works at night, it behooves me to stay awake so we'll have the same sleeping time," he said.

"So four nights a week I spend literally all night talking. I probably have it on an average of 10-12 hours a day."

The CB has meant new friends for Echols. He has more *Scrabble* and *poker-playing* partners because of it.

Among his good buddies are *Too Tall*, a blind man with the handle of the *Texas Bullfrog*, *Dynamite* and his wife *Short Fuse*, the *Green Giant* and his wife the *Lady Giant*, *Just One Dollar* and his wife *Six Bits* and their two kids: *Two Bits* and *Four Bits*.

And many, many others.

Mostly it's just for fun.

"Your new job going pretty good, *Too Tall*?" *Bed Bug* asked into the mike from his bed. "You having any trouble with those part-time employees?"

"Some of 'em showed up at 1," the voice on the CB answered. "They were supposed to be there at 9, but they had some kinda party so I don't blame 'em, shoot. Now back atcha."

"Must be nice to work for the state," *Bed Bug* said.

"Shoot yeah," the voice on the CB said. "For those part-timers. But I don't blame 'em really. Now back atcha."

And on and on, into the night.

For eight months, Jim Echols lived in an iron lung. "It's like being stuck inside a can," he said. "But thank goodness they had that can, or I couldn't have made the trip."

For 12 years, Jim Echols lived in various nursing homes.

"In the homes," he said. "Not of them. It sure as heck could have been a drag. But I just refused to be a doddering old man. 'Cause I wasn't, I was a young man."

"Years ago when they took me to Houston for a psychological profile, the doctor said one day it would dawn on me and I would really crash," Echols said.

The doctor was wrong. And that, too, is a big 10-4.



"CB travelers, entering Ohio on most of the main highways are greeted by this friendly sign." Photo by Roger H. Pelham, KDQ 3052)



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# CB Newswire

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## CB'ers Are Tops!

February 26 this year an arsonist touched off a fire that literally ignited Los Angeles. No, the City did not burn, in fact this blaze did not even find mention in any of the news media. What did happen was that a family was burned out. They lost every possession they owned.

Early Sunday morning, February 27, Daddy's Little Girl, 15, using her grandfather's radio, asked for a break on Channel 2—she told what had happened to her family and appealed for help. One man came back. Crazy Horse (Jim Rohde) KAIG 1880 who asked her to contact him on a land line and explain the circumstances. Daddy's Little Girl called and Crazy Horse took over from there. From 8:00 a.m. on Sunday morning to 5:00 p.m. on Monday he aired an appeal for help. What did they need? Clothes, furniture, appliances, beds, sheets, food and money. Jim literally owned Channel 2—most breakers took their radio checks and 10-36s to other channels and then returned to Channel 2 to offer whatever assistance they could give. The appeal acquired a ripple effect as the word got out—people took the appeal to other channels and from other channels the word spread to the sidebanders who in turn shot the problem out further yet.

Responses came from as far away as Las Vegas, where the Profit and two friends, the Monte Carlo Kid and Golden Boy (Channel 6ers) heard it. The Profit who has a sometimes base in Los Angeles climbed into his big red van and brought a donation from the



Mrs. Mary Brittin accepts cash and checks amounting to almost \$800.00 from Blue Oscar, #1 Son and Crazy Horse.

three of them into Los Angeles where he volunteered information and his time to the cause. The radio went sour for Crazy Horse. He telephoned an appeal to Blue Oscar (Jack Story), could he use Blue Oscar's base station. Affirmative. This became the command post. Blue Oscar completely turned his house over to the ranks of volunteers that began showing up immediately. The New Mexico Kid manned the phone and until the operation came to a halt, the following afternoon, could not be pried away from it. Other local CBers showed up with vans and pick-up trucks to bring in what donors could not bring in themselves. People like Cadillac, Fender Bender, Number One Son, Green Matador, the Hollywood Gumshoe, Rocky China Doll, Sandman, Satellite Kid, Oboe and Sir Galahad threw themselves into the effort. Offers came from break masters who volunteered to donate proceedings from their tables to the family notably K. C. Shotgun of the Whiskey Tango group and Little Beaver of the West Coast group.

A furniture company donated a new living room set. Another a dining room set. Over two tons of clothing came in, a refrigerator, an iron, a television set, a Hi Fi set and bedding. Financial aid came in, everything from 10 cents to \$50.00 and still the phone rang and the radio crackled. Early on Monday afternoon, an estimate was made that enough material things had been found to set the family up again. The appeal changed to send us a dime or a dollar, anything will help. As of now, over



Sam Yaw holds radio that he donated for auction as does Jeannie Reed, on right is Jerry Elliott (K. C. Shotgun) sponsor of Astro Break at Shakey's in Hollywood. Crazy Horse holds additional money donated at Break which brought total to over \$1,000.00.

\$500.00 has been received and presented to the family and the gang in Hollywood on Channel 2 have found a large new feather to wear in their hats but the feather does not belong only to them—a small or large piece of it really goes out to all those great CBers who took part in this massive effort to help a CB family that really needed it.

Looking at some hasty and probably slightly incorrect statistics, we found that as close as we could approximate, there was:

Between 150 and 200 hours of radio time expended on the effort (40 channels plus sideband time).

Close to 1600 people became involved.

Almost 7,000 man hours were totaled figuring broadcast time, telephone time, driving time, loading and unloading time, etc.

It pretty much summed itself up when the attractive XYL mother of 3, Mary Brittin said with very wet eyes "Wow, I really can't say what I feel. Thank you, all of you. My children have had the biggest impression made upon them than anything they are likely to ever experience again. The people out there are the nicest people in this whole world."

## CB Radio Patrol Formed In Knoxville, Tenn.

The first citizens band radio patrol in the Knoxville area has been established by Don Zerbe and James Harris, both of Rt. 7, with the help of Lt. Carl Beckham of the police department, Mr. Zerbe announced today.

It's called Com-Watch No. 1, short for community watchers. "CBers in Fair Oaks, Hidden Hills, Wooded Acres and Greenwood Heights subdivisions have gotten together and patrol seven nights a week to help prevent break-ins, vandalism and other crimes, Mr. Zerbe said. Anyone wishing to establish another Com-Watch or to join this one should write to Com-Watch No. 1, PO Box 4314, Knoxville, TN 37921.

# It's a tough life for a CB antenna

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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## Mass. Favorite Old Man

"Old Man" permanently damaged his lungs fighting fires and has suffered one heart attack as a result. He knows the end can come anytime.

But he says he doesn't care. At 61, this ebullient character with white, bristly hair and a craggy, lined face feels he has "lived a full life."

And according to the "Old Man," most of that living has been squeezed into the last nine months because of a CB radio.

The "Old Man" is John Columbus, a 30-year Wayland firefighter forced to retire last year because his lungs were scarred.

But you'd never know this is a man who has fought a bout with serious depression and can't venture into the cold because of bad health.

The CB bug has infected the "Old Man" with a dedicated fanaticism which his wife says keeps him from meals and absorbs virtually all his waking hours from 6 a.m. to 10 p.m.

Because of day-long monitoring of Channel 12 during the past year, "Old Man" has contacted over 700 persons. "They're all my friends," he says.

"Old Man," who asks his address and the names of all CB friends be withheld, has earned the respect of the police department for his public service, the devotion of wife and children for his courage and the companionship of hundreds of area residents.

"The CB has changed my life. I've discovered a whole new world out there which I never knew existed. I haven't had a restful minute since I started," he says.

The "Old Man" likes to "rattle cages" (joke) with his numerous "family" from a CB set placed snug in the center of cluttered paraphernalia on a breezeway desk at his home.

But he says the top priority of his busy "retirement" is being alert for troubled motorists.

Through his seemingly tireless efforts, the help of Wayland police and the support of other CBers, a 40-person "motor patrol" and an informal group of CB language monitors have been organized.

A vital link in Wayland's citizen watchdog chain, "Old Man" says he monitors about three emergency calls a day.

When a "10-33" clears the air of traffic, one or more motor patrolmen investigate the problem. If the trouble is minor, the motorist is aided free of charge.

However, if the problem is causing traffic back-up, police are notified immediately. "We try to help the police out as much as possible without interfering with them," the "Old Man" says.

Help by the motor patrol frequently includes aiding troubled motorists change a tire, jump starting a temporarily immobile car or dislodging a vehicle from an irksome snowbank.

A member of the Wayland police, identified by the handle "Cannon," says the volunteer auxiliary acts as an "extra set of eyes for the police.

"These people know the neighborhood better than some of our cops. They know who lives here, who comes and goes. You can't ask for better help than that."

To keep track of Channel 12 CBers, "Old Man" keeps an index of the names and addresses of every person he contacts. If a "turkey" acts up, he gets a letter. The rest is up to the offender.

"We don't try to police them. But we tell them: 'We know who you are. If you keep it up, we'll let the whole channel know it.'"

"Old Man" says he has received threats to his person and property because of the work of the "Turkey Farmers."

"But the Wayland police check that the 'Old Man' is OK. Once someone pulled up outside at 4 a.m. Before he had his ignition off, a cruiser was behind him."

However, appreciation for "Old Man" and many other Channel 12 CBers extends far beyond stranded motorists and local police. Just ask "Ping Pong," "Mud Hen," "Sandals," "Rainbow," Natick "Ironsidies" and Ashland "Ironsidies."

These persons are handicapped shut-ins who have had their lives and acquaintances broadened through the CB. "If they can't get out to us, we go to them," the "Old Man" says.

He tells stories of blind "Ping Pong" who was hit by a car and received 50

cards a week at the hospital; of Ashland "Ironsidies" who couldn't speak properly until constant practice on the CB made him intelligible; and of "Mud Hen" who can't stand up but now sits in bed to contact her friends over the air.

And the tales continue. Flashing an effervescent toothless grin, "Old Man" enjoys simulating the surprise of Sudbury "Sandals" when 100 persons visited that shut-in; of all the CBers who raised an antenna for wheel chair-confined Natick "Ironsidies" when bad weather felled his "ears."

"The CB gives us a chance to do good at practically no cost. It gives you a damn good feeling when you can give to people like this," the ex-firefighter says.

But "Old Man's" thoughtfulness apparently has given others "damn good feelings." Because of his daily good-natured banter and joking over the airwaves, "Fireball," the wife of old firefighter friend "Big Hank," threatened to get even someday.

"Old Man" thought nothing of it until he woke from a mid-day nap to hear raucous crowd noises on his front lawn. Always prepared to deal with a hazard to his home and family, "Old Man" strode out the front door wearing nothing but pajama shorts and a hip-straddling pistol.

What he saw was a CB "polo match" involving 100 persons and every type of "polo stick" imaginable, he says. "They brought shovels, hockey sticks, croquet mallets, bats and sponge rubber balls. I was never so surprised in my life. We had a wonderful time."

The CB family finds "Old Man's" company so engaging, the home sometimes becomes a part-time coffee shop. Just the other day, "Go-Go Wagon," a 15-year Army veteran stopped by for a lengthy mid-afternoon chat.

"You know, in my 15 years of service, I've never found friendlier people than there are in this area," "Go-Go Wagon" says in a Western drawl.

He spent most of his vacation at the house, according to "Old Man's" wife, "Homemaker."

Basking in a flood of companionship, "Old Man" appears happy in his "retirement." He says his wife and family of two sons and three daughters treat him "like a king even though I'm no angel."



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## CB Radios Are Top U.S. Theft Target

A crafty "chicken snatcher" can rip off a mobile citizens band radio rig in 22 seconds, according to a New Yorker who declined to say how he knew.

A police captain in Michigan estimates that the average life of a CB radio in a car is 28 days.

In one Southwest city the life span of a car unit is even shorter—16 days.

"The theft of CB auto radio transceivers has become the biggest single object of larceny in the U.S. today," said Wilbur Rykert, executive director of the National Crime Prevention Association in Washington.

The "chicken snatchers" or "mid-night shoppers," as thieves are known in CB lingo, have found a lucrative black market for radios, just as they did for auto tape players a few years ago.

"There is a tremendous black market for CB radios," said Bill Kanner, editor of CB World magazine. "There are flea markets on Long Island where you can get a practically new rig for about \$15."

And law enforcement officers and insurance companies expect even more thefts with the 40-channel sets.

The thievery has already led to higher insurance costs for CB operators in some areas.

Since a CB antenna is like a beacon to thieves and most cars are easily broken into, police and insurance officials recommend using detachable antennas that can be removed when the car is parked.

They also suggest installing the CB unit on a slide mount under the dash so it can be easily removed and locked in the trunk.

To help police return a stolen set, the radio should be engraved with a personal identification number, such as a serial number or a driver's license number.

And to help dry up the black market, buy from only established retailers.

## Blind N.D. CB'er 'Cowpoke' Rounds Up Rescue Units

"If I can help save even one life, it's well worth it," says the Badlands Cowpoke of his citizens band radio activities. "I've helped quite a few people out of 30-below weather. I got rescue units to them."

The 28-year-old Cowpoke—Lonnie, when he's not on the air—became legally blind in August, 1975, the result of diabetes. The Dickinson, N.D., CBER asked that his last name not be used.

"For me, CB is the greatest thing in the world," he said in a telephone interview. "I don't have time to feel sorry for myself.

"I started out on this just as a pastime," he said. "I always enjoyed visiting with truckers, and most truckers have radios. I figured if I started talking with truckers, and a bunch got to know me, it would break my monotony up, and break theirs up, too.

"I got started directing truckers around Dickinson, and it got to be real enjoyable," the Cowpoke said. "Helping them out makes you feel good and useful again."

He said he has talked with hundreds of truckers, has met about 10 of them and recognizes many others by their voice or handle.

"I love wrecker calls," the Cowpoke said. "It makes me feel good helping out someone on the other end. I've been stuck a lot of times and had to walk.

## CB Jargon Joins Calif. Couple

"Breaker, breaker," the preacher said. "Do you, Widow Maker, take Minnie Mouse to be your XYL until you 10-7 permanently?"

"Ten-four," the couple answered, and

"I'm not trying to be a glory-hog," he added. "If someone else wants these people, I let them, unless they don't know where they're at. When everybody jumps and tries to help, a guy can get so cotton pickin' confused he doesn't know which way is up."

Lonnie said he keeps his CB on 24 hours a day.

"If somebody hollers at me in the middle of the night, I take that, too," he said.

"The only thing I really don't like is if they holler for a party. I don't drink or smoke. If there's a party, I'm the last person in the world to know.

"Another big nuisance is asking for the time of day," he said. "I wonder what they used to do before they had CBs."

Lonnie got his CB radio last Labor Day.

"We'd been looking at radios for more than a year, but we kept putting it off," he said. "My better half didn't go along with my idea of a radio. She thought they were too noisy. But I was on the telephone all the time, and anyone trying to get hold of me couldn't.

"I come from northwest of Amidon, in the Badlands area. I started as the 'Badlands Cowboy' but found a couple others had the same handle. I picked up 'Cowpoke' from the cartoons."

The former beekeeper said he plans to take tests to determine his abilities, and training could begin as early as spring. "I hope I can stay in CB," he said, "but it's hard to find a job that pays enough."

Members of a CBERs household may use his license, and Lonnie said his wife uses the radio.

It might become a family tradition. The Badlands Cowpoke said he and his wife bought their 4½-year-old son—Little Cowpoke?—a battery-operated toy CB for Christmas.

thus did Larry Miller, also known as Widow Maker, marry Helen Frain, whose "handle" is Minnie Mouse, in a citizen's band-equipped car at a park in Redding, Calif.

Just to make sure, they also said, "I do."

The service was spoken over CB channel 13 by the Rev. Donald Palmer, also known as Silversmith, with Otis Croll, or Whiskey Man, as best man.

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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## CB's Help Promote Road Safety

The CB radio boom, which began three years ago with a truck driver protest strike, has spawned a cooperative citizens law enforcement network which promotes highway safety in 30 states.

In 1974 truck drivers were using their CB radios to warn each other of "smokey's" whereabouts during their protest against the new 55 mph speed limit and rising cost and scarcity of fuel stemming from the Arab oil embargo.

Today, truckers are seeking out the police on their CB radios to share observations about road hazards and speeding violators. Police are thanking truck drivers for their help.

It was nearly 30 years ago that the Federal Communications Commission approved a citizens band radio network.

When the CB boom began in 1974, applications for FCC licenses began mounting. In 1975, the FCC was receiving 50,000 requests each month for new CB licenses. By early 1976 requests totaled nearly 550,000 a month.

"It took 16 years to get the first million CB licenses, eight months for the second million and only three months for the third million," one FCC official said.

Police departments in the United States and Canada favor CB radios, even though they realize they are "sitting ducks" for reports on their whereabouts.

As one trooper said, "Every time I hear a report about where I am, I feel like I'm taking a shower in public."

Col. Sam Smith, superintendent of the Missouri Highway Patrol, said his state's CB radio law enforcement network has surpassed all expectations.

The two-year-old program records nearly 6,000 calls a month. One-fifth of all accidents investigated by the Missouri Highway Patrol are first reported over a CB radio.

Smith said he isn't bothered when smokey reports are broadcast over CB radio. In most cases, if a CBer asks the location of a patrol car, the information will be given.

"Even though one CBer tells another the location of a smokey," Smith said, "the chances are very good that he will call that same smokey in a few minutes if he should spot a speeding driver or an accident down the highway. In this respect, the good far outweighs the bad."

He attributes the success of the program largely to the numbers of calls received from truckers.

"When they first noticed that we had 'ears' (CBs in patrol cars), they reported intoxicated drivers, wrong-way drivers, stranded motorists and other matters requiring law enforcement officials," Smith said. "That indicates to me truck drivers truly care about highway safety."

CBers also save lives.

"Each minute an accident victim must wait until medical aid arrives at the scene can mean the difference between life and death. CB reports to a trooper versus a telephone call have cut the waiting time by about six minutes," he said.

Smith says there is little doubt of the value of CBs as a transportation safety tool. It enables citizens to request assistance, report highway hazards and receiver safety information.

The Mississippi Highway Patrol credits CBs with a 5 per cent reduction in traffic accidents on state highways in 1975.

Bill Massey, the patrol's communications director, reports nearly 7,000 calls are received each year, "and in no instance has there been a false alarm, nor has there been any calls designed to harass or cause trouble to the police."

The Ohio Highway Patrol encourages truck drivers with CB radios to report suspicious persons lurking on overpasses in hopes of preventing accidents caused when objects are thrown down at oncoming vehicles.

Most truck drivers own their own CB radios and use them frequently. "It's my friend and constant companion," said one driver. In an emergency, "it's nice to know someone is out there listening for my call of help. When I need accurate road condition reports I can get them. I can talk to friends on the road and keep from getting lonely or tired. CBs pretty well fill me in on what's going on on the highway.

Others complain that the frivolous use of CBs by non-professionals has hindered them in making emergency calls. At peak times and in crowded areas, the CB airwaves are too crowded to handle all the traffic.

Even the recent expansion from 23 to 40 channels is not expected to alleviate the problem.

## Texas Bill To Fine CB'ers For Blocking TVs Goes 10-7

A bill to fine CB radio operators for interfering with television transmission has gone 10-7.

Rep. Sam Hudson of Dallas introduced the measure, House Bill 383, at the request of some constituents who said CBers were interfering with their television sets.

Hudson's bill set fines of \$100 or the amount of actual damages, whichever was greater, for interfering with television reception. Persons suing CB'ers for interference also could have collected for attorney's fees.

Publicity about the bill brought down the wrath of the CB hordes upon the Dallas legislator, who heard more static about his legislation than his constituents ever heard on their TVs, Hudson's office said.

Discretion being the better part of valor, Hudson now has decided to approach the interference problem from the other end of the transmission. A new bill, House Bill 1440, would require all televisions sold in the state to have an inexpensive interference filter to eliminate disruption of programs.

For equality's sake Hudson now proposes to shift the \$100 or greater fine to merchants who sell televisions without the filters.

Hudson fully intends to pursue his revised bill, his office says, but the original measure has about as much chance of surviving as a bug hitting a speeding 18-wheeler.

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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## Texas CBers Give All For 'Fuzz' Kin

"Carpet Cat" held a garage sale in Lubbock, Tex., last March and raised \$1,000 for the family of "Fuzz," a CBer who died of a heart attack. The sale also brought the sprawling "Channel 22 family" closer together.

"Fuzz never said a bad thing about anybody," said Carpet Cat. "The old Fuzz was always clowning. He never would get agitated at anybody."

When the CBers heard of the family's need for money, they decided to use the radio to organize the sale. "Big

Tooth," "Merry Man," "Brandy," "Smallfry," "Gerbil," "Carpet Kitten" and "Lisa's Moma" scanned the channels, broadcasting word of the sale in this West Texas city.

More than 600 persons stopped at Carpet Cat's home to shop for comic books, shag carpets, lawn-mowers, clothing and an \$800 organ donated by a CBer.

More cash developed through CBer Brandy's sacrifice.

A collection was started to keep Brandy from singing over the radio, then another collection was started to make Brandy sing. Those favoring silence won with a \$35 donation.

"I grew up in a small town and we had a lot of farmers," said Mercy Man. "And when one would get sick, we'd all help. The CB has brought everyone together.

"Fuzz was always defending the women. He was a gentleman, a good, nice CBer," said Blackjack Mama who met Fuzz on Channel 22 three years ago.

"Whenever he and his wife (Lily Dewdrops) visited us, they always brought their kids. They were a real beautiful family," she said.

"Twenty-two is more of a family channel," said Brandy. "The only time Fuzz got mad was when a guy came up from Channel 19 and made some vulgar remarks at me."

By the end of the sale more than \$1,000 had been raised for the family of the popular CBer.

"One son (Texas Termite) loves to talk on it like Fuzz," said Blackjack Mama. "But nobody will be using Fuzz's handle on Channel 22. That will always be his."

## Here's A CB Story!

Here's a CB radio good samaritan story from the West Coast guaranteed to bring a smile to your face.

Second Lieutenant Don Alsdorf had just graduated from the MP officer basic course at Ft. McClelland, Ala. and was headed to his new assignment with the 7th MP Company.

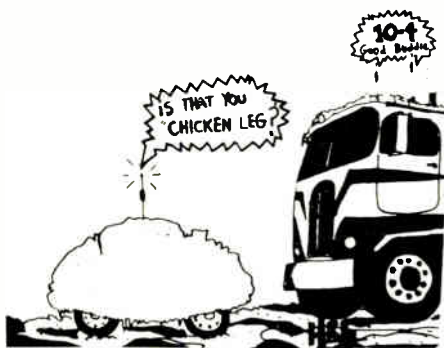
After a late November stopover at his home in Minneapolis, Alsdorf started for the West Coast in his Fiat.

Enroute, he ran into some unexpected snow squalls in Nebraska. Alsdorf's little Fiat couldn't handle the snow and wind. Driving became hazardous. Truckers on Interstate 80 saw his plight and warned him of even heavier snow ahead.

It was just after the first CB warning that "Chicken Leg," a handle that Alsdorf will soon not forget, came to "MP's" (Don's CB handle) rescue.

"Chicken Leg" asked him the size of his car. Alsdorf answered and the trucker told him to drive into the next truck stop. He then offered to load the car into the back of his half-full truck.

Sure enough, as soon as Alsdorf made it to the truck stop, there was "Chicken Leg's" truck. The trucker and the lieutenant loaded the car onto the



back of the semi and headed west for Carney and Ft. Ord, Calif.

The good samaritan turned out to be a private contractor on his way back from Michigan. The trucker had made the "flip-flop" run from coast-to-coast quite often. This time he was making the trip with his wife and only half a load.

Once in California, the trucker headed for his home and gave the lieutenant his first taste of West Coast hospitality and home cooking, then drove Alsdorf and the car another 150 miles out of his way to Salinas, where the two parted company.

Neither "Chicken Leg" nor his wife would accept any money for their hospitality, only Alsdorf's thanks and a promise to come and visit when time permitted.

## CB-er Spots Fire Under Cleveland School Bus

Citizens' Band radio annals are replete with accounts of good deeds performed by CB-ers. Here is one about Little Shamrock and the school bus:

Little Shamrock is the handle of Dennis Gibbons, of Avon Lake. He was driving behind a Berea school bus on Ruple Rd. when he noticed smoke and flames coming from under the bus frame.

Gibbons swiftly alerted the woman bus driver over his loudspeaker. Then he got clearance for an emergency call to the Berea Police and Fire Departments.

Meantime, Little Shamrock grabbed his fire extinguisher, helped empty the bus of students and put out the fire. He was helped by Sigmund Nachman who was plowing his driveway and saw what was happening.

Police and firemen arrived to find everything under control.

Gibbons was on his way home from work when he made a bit of CB history for Little Shamrock. He belongs to the West Shore CB Club.



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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## Some CB Users Step Up Power To Monopolize Air

Don Mather, a member of the coast guard auxiliary in the municipality of Delta, Vancouver, says people who regard citizen's band radios as toys are taking over the air waves.

Mr. Mather monitors his CB radio for distress calls. But he says, while most CB radios are bought by sensible, legitimate users, a small percentage—perhaps only five per cent—is making things miserable for everyone.

They talk on Channel 9, which is reserved for emergencies and increase the power of their equipment so they can wipe other users off the air.

Larry Reid, Vancouver manager of Communications Canada, the agency responsible for licensing and policing CB use, says the biggest problem with those who modify their equipment is that often they do not know what they are doing.

The modified signals interfere with television and stereos. They also get police, ambulance and taxi frequencies.

He says there have been instances of people putting out fake distress calls, potentially endangering human life.

Mr. Mather says British Columbia is long overdue for a disaster and when it happens, CB radio is going to have to play a major role. He would like to see it made more difficult to get a CB operating license.

"We think people should be required to get a license before they buy a CB unit. At the moment, it's ridiculously easy to get a license. I could get one for my dog if I filled in the form and mailed in the money (\$13.50 for three years).

Mr. Reid says because of the large numbers involved it is difficult to police the conduct of CB operators.

He says the existing channels are approaching the saturation point and small businessmen, for whom the system was primarily intended, are abandoning it because of the overcrowding.

CB club members blame the department of communications for failing to get the offenders off the air.

One club member suggests the department should put monitoring staff on the night shift, where all the trouble is.

He says some of the worst offenders have immobile CB sets in their homes.

"But they know that in the evenings and on weekends they can't be touched. They can tie up channels and sit there and laugh."

Meanwhile, CB retailers are reaping the benefits of the boom.

In Vancouver alone, there are 13,000 licensed operators and applications for new licenses are being made at a rate of 1,000 a month.

Ontario Provincial police said they are investigating the incident.

A police spokesman said the car probably ran into the rear of the trailer just west of this town.

The driver may have jumped out while Nickolson continued on Highway 11 until he was stopped at Guthrie, Ontario, he said.

An ambulance was later called to an area just west of here to pick up a man who had suffered multiple injuries.

Police said the man had to be placed in intensive care at a local hospital. It is not known whether he was the driver of the car.

## Antenna Hits Wire, 4 Hurt In Florida

Four Pleasantville, Fla. men narrowly escaped being electrocuted yesterday when an antenna, mounted on a CB radio tower, hit a high tension wire while the four were taking down the tower.

The men were admitted around 4 pm to Titusville Hospital.

The hospital issued these condition reports:

Thomas Anderson, 21, in fair condition in the intensive care unit.

Willard Westcoat, 27, Pleasantville, in fair condition in ICU.

Robert Caldwell, 31, at whose home the accident happened, admitted for observation.

Randy Daley, 21, also admitted for observation.

Eyewitnesses at the scene said right after the accident neither Westcoat nor Anderson apparently were breathing.

People in the neighborhood, John Shaffer and his wife, who is a registered nurse, and Gwendolyn Caldwell, Anderson's sister, administered artificial respiration until the Titusville ambulance arrived.

Both men had started to breathe, Mrs. Shaffer said, by the time the ambulance got there.

Pleasantville's fire chief, Grant August, said firemen were summoned to the scene after the accident to take away the remnants of the antenna in close proximity to the electrical wire.

He said there was no power outage because the light aluminum antenna was burned off so fast by the current that it did not cause fuses to blow.

He said the firemen called on Penlec personnel to remove the tower, which had fallen sideways on the roof of the Caldwell house and was not far from the high tension wire.

The 30-foot tower and antenna were mounted alongside the house.

At the time the men were shocked, they were all holding on to the tower, August said.

## CB Call Tells Driver He's Towing Empty Car

Truck driver Donald Nickolson of Toronto picked up a hitch-hiker without knowing it.

Nickolson was told by a passing motorist over a citizen's-band radio that he was towing an unoccupied car whose front end was locked to the back of his trailer.

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# CB Newswire

YOUR CB NEWSPAPER

JULY, 1977

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## Angered Mass. CBers Chase, Capture A Colleague Who Used Bad Language

A group of citizens band radio enthusiasts intent on policing another operator for using profanity over the air chased the alleged offender through five communities before surrounding him the Mass. State police said.

The police said the offender and passengers in his auto were boxed in by about 16 CB-equipped vehicles just as a trooper caught up with the bizarre caravan.

"He was surrounded like a wagon train," Trooper Peter J. Higgins said of the target of his fellow operators' ire. "They had about eight cars behind him and a roadblock across both lanes of South Street."

Higgins said the Pittsfield barracks were alerted to the chase by a CBer who was not involved about 11:30 p.m. "He came in and said there was a chase on Channel 18; we turned our set to that channel, and it sounded better than one of our chases," Higgins said.

As he reconstructed the situation after talking to both sides, some operators who objected to the reported on-the-air profanity began following the supposed culprit in Pittsfield, and their pursuit eventually went through Dalton, into Washington, and by way of back roads into Lee and Lenox before starting north again on the Routes 7 and 20 bypass there.

In the meantime, troopers from both the Pittsfield and Lee barracks were trying to locate the cars. "It was hard to hear, since everybody was talking at once, although some girl with a base station at her home was coordinating it," Higgins said.

Higgins described the encounter as a "touchy situation," but said neither side appeared bent on violence when he arrived.

He took the alleged offender's name and address and turned it over to the pursuers, who said they would write the FCC.

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## Trucker's Widow Averts Hill Tragedy

"I was meant to be on Newfield Hill," said Linda Bell, a truck driver's widow whose use of a car CB radio may have prevented a truck accident from becoming a tragedy.

A truck, driven by David W. Atkinson, 25, of Cincinnati, Ohio, was headed toward Ithaca (N.Y.) on Route 13, down the long, winding hill, when its brakes gave out.

With Mrs. Bell's help, Atkinson was able to walk away from his wrecked tractor-trailer, which slammed into a parked truck.

The driver of the parked truck, Esiek Roberts, 53, whose cargo of lumber spilled on impact, had been in the rig when the crash occurred, but escaped serious injury.

Atkinson's truck then rolled over and

dumped a load of steel, a sheriff's deputy said. Atkinson was taken to the hospital where he was treated for scrapes and later released.

"I was driving down the hill when I saw smoke from the back tires of this truck and I knew the driver was in trouble," said Mrs. Bell.

"He came on the air and said, 'Northbound runaway,'" she recalled.

A picture of Mrs. Bell's husband, pinned in the cab of his truck three years ago, flashed in her mind, she said.

"So I took it from there. I said 10-33 and everyone cleared the air," said Mrs. Bell, who has worked as a radio dispatcher for the Finger Lakes State Park Commission Police.

"I said, 'There's an 18-wheeler flatbed out of control.'" (Atkinson) said. "Am I going to come level?" I said, 'Negative. You have a very sharp left-hand turn at the base of the hill.'

"I said, 'At the bottom of the hill you have the option of a wide-open

field, but you'll have to jump the road to get it.' He said, '10-4.'

"I said, 'God be with you. You're not alone. I'm right behind you.' He said, as near as I can remember. 'Pray to God. I hope He's with me. I'm not going to make it.'"

Atkinson later said he meant he was not going to be able to keep his truck from tipping over, and probably not from hitting the parked truck at the foot of the hill.

Mrs. Bell said the entire incident must have happened in a minute and a half.

"After the accident, I saw him climb out of his cab, and I came on the air and said, 'He's all right. He climbed out and the other driver is getting out, too.'"

"The driver (Atkinson) had shattered glass all over his face and tears streaming down his face. I helped him get the glass particles off his face, then we just held each other for a minute, just glad that everyone was all right."

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by Tom Kneitel/Tomcat  
Editor of CB Radio/S9

**T**HE world is filled with people who want to "be better" than someone else. Sometimes it's a matter of pride, or maybe it's just a case of wanting to get the advantage on others. That's why Detroit sells so many cars that are capable of doing more than 55 MPH, even though it isn't legal to exceed that speed. In the world of CB you can also get the capabilities of "exceeding the speed limit," you can do it by ignoring the 4 watt power limit to make your station louder than the others—Uncle Sam permits Detroit to continue to grind out 427 car engines; Uncle Charlie doesn't permit you to use more than 4 watts.

There's the problem—many CB'ers are using more than 4 watts! Some are running a *hundred watts or more!*

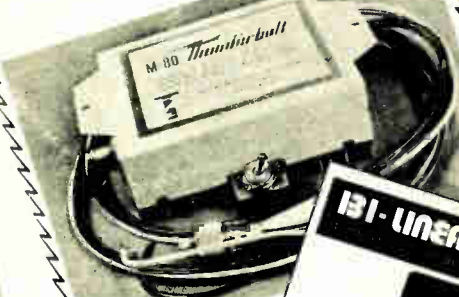
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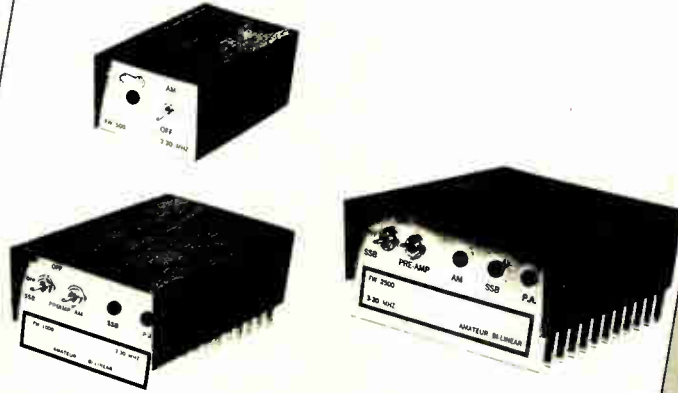


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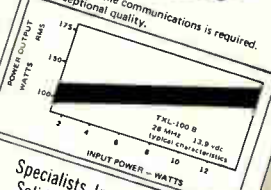
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ILLEGAL FOR USE ON  
 11 METERS IN U.S.A.

helpers, socks, tigers in the tank, moccasins, persuaders, wearing socks, or simply linears, these devices have been around CB since the very earliest days of the 1950's.

The fact that they are outlawed on CB has made little difference to many thousands of CB'ers who use them, to the many dealers who sell them, and to those who construct them. In fact, the manufacturers of CB linears have sorely vexed the FCC for years with a curious cat-and-mouse game in which poor old Uncle Charlie always seems to come out the loser!

Today, illegal CB linears are made, sold, used, with an amazing lack of concern for the fact that they are

so clear a violation of FCC regulations, and that present regulations against their sale and use are the result of several stages of increased attempts at killing them off! Despite their being more illegal now than ever, they are also more easily obtainable and more frequently used than ever before.

But Uncle Charlie has not yet picked up his cap, dusted it off, and slowly walked towards the showers on this issue. Press releases and proposed new regulations are again starting to flow from the FCC's hallowed halls, users of linears are starting to see the results of increased enforcement, and the FCC is cooking up yet another attempt to settle the problem.

## THE NATURE OF THE BEAST

See, the thing is that linears *themselves* aren't really illegal, it's only when they are used on CB channels that the whole situation gets to be a hairy canary. That's been the problem right along—how to juggle the FCC regulations to permit their use where they are allowed while choking them off for CB'ers. It's seemingly impossible to do this effectively. Ask the FCC!

Linears have traditionally been used in other radio services such as the Amateur (ham) Radio Service, where the FCC says they are OK. But NO WAY can they be legally used by CB'ers—but some ham frequencies are so close to CB channels that a linear constructed for ham use might well be identical to one made for illegal CB use.

But then, is it the responsibility of linear manufacturers to police the uses to which their products are put? This is part of the problem—it's like asking an auto manufacturer to be responsible for a car buyers who break the speed limit.

Let's look at linears and their curious evolutionary course on CB channels, see the frantic efforts of the FCC to kick them off the band, check out what the FCC has in mind for their next try (perhaps their best shot); we might even examine whether linears are really worth all of the fussin' and fightin' in the first place!

## FIRST GENERATION LINEARS

Many of the earliest CB'ers licensed were ham operators. They quickly realized that some of their higher powered ham gear was totally suitable for CB operation—fact was that CB channels were actually carved from the radio spectrum by pulling away from hams their little-used 11 Meter ham band.

So the very first linears to appear on CB were those which had been intended for and had earlier seen service on ham frequencies. These included the *Globe LA-1* (200 watts), *P & H Electronics LA-400B* (200 watts), the *Vantron 300* (100 watts), the *Central Electronics 600L* (300 watts), and the imposing *Johnson Viking Thunderbolt* (750 watts).

It wasn't long before someone (nobody knows



The most famous second generation CB linear of them all was the imposing e.c.i. base station linear of the early 1960's. Not too pretty, but the company had a hard time keeping up with the demand for them.



Companion unit to the e.c.i. base station footwarmer was this mobile unit which could be trunk mounted—except that you had to turn it on and off from inside the trunk—and it generated rather high temperatures.

who after all of these years) came up with the idea of zeroing in on the blossoming CB market with linears specifically designed for CB use. Yes, even in the early days of CB the FCC's rules didn't permit them—although they were nowhere as specific about linears as they later became. But they were still illegal, nevertheless.

## SECOND GENERATION CB LINEARS

Realizing that linears were not permitted on CB channels, the producers of early-1960's Second Generation CB linears added a disclaimer to their descriptive literature. Something to the effect that their linears were "illegal for use on CB channels in the United States." Sometimes they would also say that they were designed for operation between "25 and 30 MHz," without ever mentioning their applicability to possible CB use.

CB RADIO/S9 has long had a policy of refusing to accept display ads for linears, regardless of disclaimer wording, however such ads have always seemed to find a home in many local and regional CB newspapers and newsletters.

The majority of *second generation* CB linears were bulky and cumbersome—but they found a ready market nevertheless. Linears of this era included the *eci electronics* unit made "for the 6 and 10 meter ham bands," the same manufacturer's compact (early solid state) *Model ML-100* made for "business band," the really ugly *Elenco L-200*, and the *Sonar Radio BR-21*. These devices were designed for outputs from 14 to 200 watts.

Aside from the fact that ads for any of these units hardly ever appeared in publications other than those directed towards CB'ers (in any event, they were advertised much more heavily in CB publications than anywhere else), they all seemed to be factory peak-tuned right in the middle of the CB channels. Those advertised as being operable "between 25 and 30 MHz" didn't work worth a hoot on 25 or 30 MHz, they needed repeaking and retuning, the *c.c.i.* linear

(continued)

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Model antennas not to scale

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required new coils to work on the 6 meter ham band.

They were, plain and simple, CB linears, and that's a fact. They were cleverly marketed so as to avoid any possibility of being called CB linears—and, well, if a CB'er wanted to buy one and use it on CB, that was not the responsibility of the manufacturer, the dealer, or the publication which ran the advertising! The FCC was watching this 3-ring circus with no little consternation—"well, yes, these devices are illegal on CB, but, then, they are not being offered for sale as CB linears", they were saying to themselves as they scratched their heads wondering what to do about it.

Eventually the truckers started yakking on CB, and this created an even bigger market for CB linears—truckers found that linears not only kept their feet warm, they also helped to produce some extra talk power.

### THIRD GENERATION CB LINEARS

This increased market, also helped by the regular CB market starting to grow, brought many new linear manufacturers onto the scene, bringing with them 1970's technology and design features.

The FCC had hoped that their newly instituted CB type acceptance regulations would be effective in bringing the linear mess to an abrupt halt—but it didn't.

The new *Third Generation* CB linears were smaller, more compact, featured semiconductors, PC boards, IC's—some manufacturers didn't even continue to put disclaimers in their ads. It was really getting out into the open, in fact.

Third generation CB linears could (optionally) boost *incoming* signals as well as signals from the transmitter, a panel switch would permit selection for use with AM or SSB rigs, they became the hit of CB!

It was obvious that type acceptance was not capable of ending the flow of linears into the CB market. Obviously they could not get an FCC seal of approval for CB use, but they were still in plentiful



A transitional second generation boot, the e.c.i./courier ML-100 was actually on the way to being a full-blown third generation unit. It replaced the larger heat-generating model, and was fully transistorized—didn't require any "tune-up".



Sonar's BR-21 was another early entry into the second generation linear field. A panel meter gave you immediate information on what was happening inside. It provided a modest 14 watts boost.

supply because too many people just elected to ignore the FCC. Besides, despite the fact that most *footwarmers* would work only on CB frequencies, their manufacturers and sellers weren't really claiming that they were *for* CB use—usually they were simply described as linears, without any specific frequency band or radio service indicated. Were they for CB use? *Of course not!*

Then why did they operate on 27 MHz? That's because, it was said, that they were for use overseas where foreign governments authorized higher power for communications in this frequency range—fact was that the 11 Meter ham band still exists in some foreign countries. *Dra! Foiled Again!*

### A NEW POSITION

The FCC's next position was to change the rules again. By late 1974 they announced that they prohibited the manufacture and sale of linears which operated only on one single frequency band—more exactly, if that frequency band was located anywhere between 24 and 35 MHz. Exempted from this regulation were multi-band (more than one frequency band) linears "for amateur use." Hams would still be able to homebrew single-band linears for their own use, however, such a device could be sold by the ham to another ham operator on a one-time basis.

To put teeth in this, the orge of the Federal Trade Commission was trotted out to breathe smoke and flames, lest there be any manufacturers or dealers who were inclined to continue to ignore Uncle Charlie.

This didn't work, but it did lead to:

### FOURTH GENERATION CB FOOTWARMERS

If multi-band linears were given the green light—if *that* is what it would take to satisfy Uncle Charlie, well, that's exactly the kind of *footwarmer* which would become available! So, 4th generation linears emerged, simply a refinement on the previous genera-

*(continued)*



# HEY! Getcha Giant Skipland Map Poster!

The **CB Skipland Map** in our November issue has been souped-up and reprinted by popular demand! We made a more detailed (lots more things—including most major cities with their CB handles) huge size version (17 by 23 inches) on high quality, colored stock—just right for the wall of your CB shack! It's sort of a limited edition, so now's the time to move if you want one! Here's how to get your own highly detailed version: fill in the coupon below, enclose only **\$1.75** (includes postage and mailing) and send it back to us! This map will really blow smoke with everybody who sees it!

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*"Travelin' on the road, I used to get to talking to myself. It was a lonely, lonely way to spend my time. But with Teaberry on the road, I've got more friends than I'll ever know. Let Teaberry help you get on the party line."*

Take it from a guy who knows what it's like out on the road. Mel Tillis, Country Music Entertainer of the Year, logs over 130,000 miles a year on his bus. Mel's sold on Teaberry 40-channel CB radios. He's sold on their quality and on the loads of features that are available. And he likes the distinctive good looks of the full Teaberry line. But, best of all, says Mel, is the Teaberry **One-Year Full Warranty**. The warranty, in itself, tells you that Teaberry stands for quality.

So, take it from Mel Tillis, and keep in touch with T-T-Teaberry!



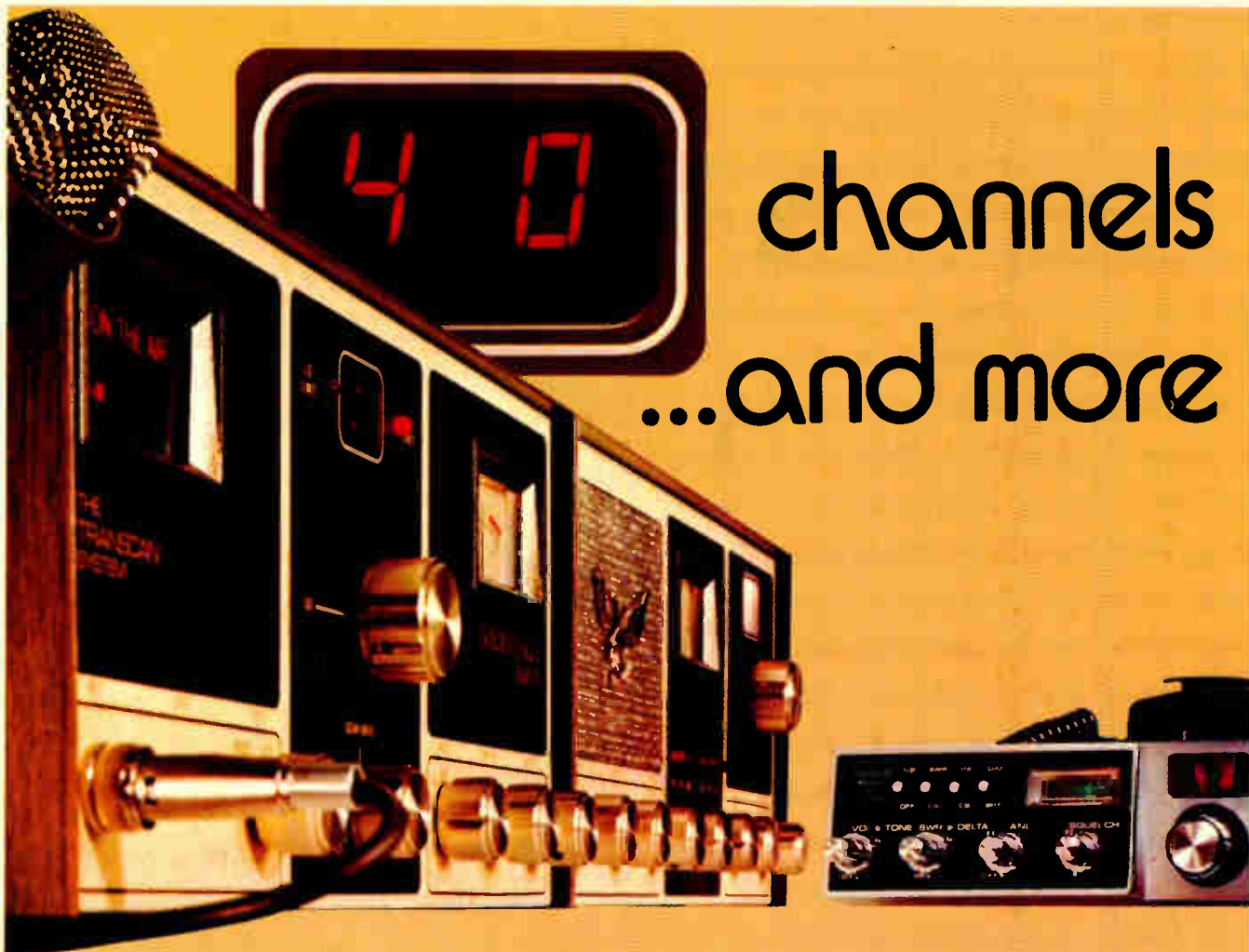
When you see Mel's bus out on the road, give ol' "Flutterin' Lips" a shout . . . or let his driver, "Radio Red", tell you about his rig. It's a Teaberry, of course!

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that mobiles can use all of the help they can get—and even 2 S-units is nothing to sneeze at when battling all of the 18-wheelers for a 10-13 on Channel 19!

The major thorn in the FCC's side is the base station use of linears, since by the time the souped-up signal gets run through a base station antenna offering *even more* signal amplification the results can be quite formidable and can really jam a channel for many miles into the distance.



A finely produced fourth generation mobile linear is the all solid-state Pride 150, it has a wide acceptance by ham operators!

### A QUESTION OF GAIN

A 10 DB gain is about a 10 times increase in power. So a 4 watt CB signal enhanced by 10 DB is effectively a 40 watt CB signal—this is called 40 watts of *effective radiated power*, or “ERP.”

If this 40 watts ERP is again run through a base station antenna offering, let's say, another 10 DB of gain, the ultimate result is 400 watts ERP! Think about the possibilities of this stunt attempted with a 250 or 500 watt linear! And there are a number of base station beams which offer far more than 10 DB gain!

Since beam antennas are permitted under FCC regulations, it would be quite adequate to work within this legal framework in order to enhance your legal 4 watt signal—the legitimate gain which can be obtained by use of a beam (minus linear) is certainly sufficient for just about any communications purpose.

A bi-lateral linear (boosting incoming signals as well as those transmitted) used with an omni-directional base antenna drags in unwanted signals and noise from all directions, while sending out your signal in all directions—including directions which are not required for communications.

So why have base station operators used linears when they probably could have gotten enough signal to meet their needs by just the use of a beam alone? Well, linears are easier to install than beams—also,

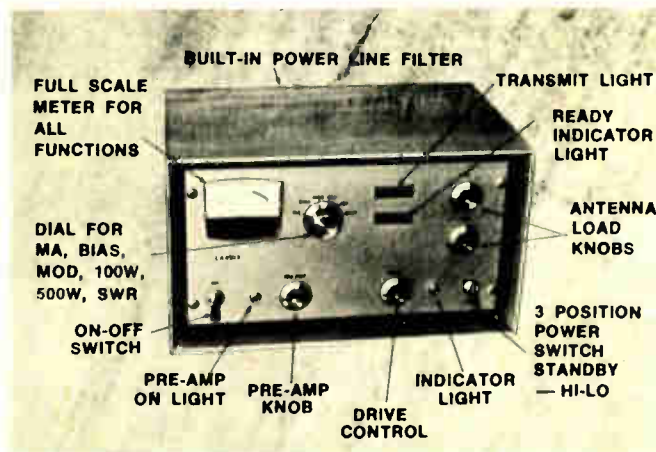
I suspect that linears have now developed a strange charisma in CB land, a legendary status for themselves—CB'ers *think* that they are the *only* solution to improving communications.

### THERE ARE PROBLEMS, TOO

The use of CB linears is not without several problems—besides the fact that they are not permitted, and you can send your signal out much further than is necessary.

For instance, one problem concerning their use surrounds the fact that CB equipment is generally designed to be used in conjunction with equipment designed for the CB service, and having a capability of handling signals in the 4-watt category. The casual insertion of a 100 watt signal in the middle of this mini-communications system can pose some interesting problems.

While some base station antennas can grapple with a bit of heat, most mobile antennas (especially loaded mobile whips) will absolutely go bananas when someone attempts to force-feed them with a heavy transmitter output. Most CB'ers don't realize this—at least



A high power linear from Norcom, showing an explanation of all of the dials, buttons, and other controls. This unit will run about 450 watts—however the manufacturer's press literature carefully ignores mentioning the frequency bands upon which it works.

not until they see the fireworks and end up with a melted antenna—and perhaps a *footwarmer* which will no longer be capable of getting their feet very warm. Along the way, other CB accessories may also go west when juiced with a linear—and I've heard gory tales involving the destruction of CB wattmeters, TVI filters, dummy loads, etc., when connected to linears.

Another problem which has been reported has been the attempted use of mobile linears at base stations; powering them from power supplies intended for use with CB rigs. These power supplies produce about 2 or 3 amps, while the linears require 10 to 20 amps. *Poof!*

(continued)

tion units—now on the scene with multi-band design.

From a manufacturing standpoint, it wasn't too much of a task to produce multi-band versions of their previous products. Some 4th generation footwarmers had bandswitching knobs to permit selection of the desired ham bands from 80 through 10 meters (3.5 thru 30 MHz, which includes CB frequencies), others were simply broadband tuned to cover this chunk of radio spectrum without further tuning. A great many of these units are highly sophisticated and are well made—a few are rip-off copies of the better made units. Some of the 4th generation units which seem to be in use across the country include the *Westcom* TXL-100B, *Pride* 150, and models from *Varmint*, *Hooker*, *S.T.E.*, *Telco*, *Maco*, *Marko*, *D&A*, *Stacom*, *Palomar*, *Digital Sport Systems*, *Thunderbolt*, and *Norcom*.

The CB linear may well have turned a few tables, since (as I pointed out) the first linears to appear on CB were ones which were actually intended for ham use. Those linears which today are primarily aimed at the ham market, such as the *Dentron*, *Drake*, *Sigma*, and the *Alfa*, are 1,000 watt jobs and seem to cost mucho greenstamps. Apparently some ham operators are quite content to settle for less than a *full gallon* (ham type lingo for 1,000 watts—although for hams it's legal!) and have picked up on use of some of the better made *footwarmers*—putting them to legal use on ham frequencies! A smattering of the 1,000 watt ham linears have found their way into CB, however that much power has only a very limited number of supporters on CB—even amongst those who dig *footwarmers*! One CB'er told me that if 100 watt linears were *footwarmers*, 1,000 watt jobs were, for sure, *hunion bakers*!

There are, in addition, still an increasing number of nameless and anonymous *junker* CB linears still pouring out of garage and basement "factories," mostly 100 watt mobile jobs—linear manufacturers to whom I have spoken are appalled at the seedy quality of these fly-by-night linears which the CB public seems quite willing to accept.

For the FCC's part, they really don't see much delimitation between the quality (or lack of it) in a linear—good, bad, or in-the-middle, if it is sending out signals on CB channels they bristle with anger, the same anger whether 100 watts or 1,000 watts!

### WHAT'S NEXT?

The FCC has now run up the flagpole a new set of proposed regulations looking towards the *final solution to the CB linear problem*.

The FCC proposal now is that—whether single-band or multi-band, linears cannot be capable of being operated anywhere in the frequency range of 24 through 35 MHz. The FCC noted that those hams using the 10 Meter ham band would be affected ad-



A high quality fourth generation base station linear has been produced by Palomar—it has a potential 400 watt sock if fed from an AM CB rig.

versely by this proposed new regulation (since that band lies within the forbidden band), however hams would still be able to build linears for themselves so long as they built no more than one single unit. The FCC said that "it assumed" that hams would "respect the intent of this regulation and would not supply" linears to CB'ers.

Married to this new regulation is another proposed regulation calling for type acceptance of ham radio transmitters and linears. Mentioning that much ham equipment can be used illegally on CB frequencies, they said that they were hoping to establish manufacturing standards which would help to eliminate the possibility of ham gear that could be tuned up on CB frequencies. Hams would still be able to build their own homebrew gear, although transmitter and linear kits would have to receive FCC type acceptance (the kit manufacturers would have to furnish 3 assembled kits to the FCC for testing before the kits could be marketed).

FCC Chairman Richard E. Wiley is uneasy about aspects of these proposed regulations. Saying that while he agreed that steps should be taken to remove linears from the CB channels, he felt that the FCC's efforts to accomplish this would possibly be "penalizing the hams."

### TEMPEST IN A TEAPOT?

Through it all, the overriding question is—just exactly is all of the fuss about? What is it about linears that has caused them to have such a high appeal (millions may be in use) despite the fact that they are outlawed. Will they really do anything for the CB'er?

Let's put it this way, a 100 watt *footwarmer* will boost a CB signal by 14 DB, that will soup-up the signal on the receiving stations S-meter by just over 2 S-units more than the un-boosted (*barefoot* is the popular term) signal. While this does give aid to the signal, it does *not* (as many linear owners seem to think) pin over and bend into pretzels the S-meters of every other CB rig on the channel for 50 miles around.

The primary market for CB linears has been for mobile use, since many operators have come to feel

(continued)

Linears, at their best, have the annoying habit of amplifying any unwanted harmonics and spurious emissions from a CB rig, so if you've got a weak 2nd harmonic radiation from your CB rig which isn't strong enough to cause TVI, chances are that after it's fed through a *footwarmer* it will have enough machismo to knock out TV Channel 2 for some distance around your station. And if you've got problems with front-end overload of area TV sets, a linear will extend this problem over a much wider region.

But that's not all—due to poor design of some of the *footwarmers* we've seen, some aren't truly linear. They will, in fact, generate much in the way of spurious radiation on their own—radio *garbage*—on all sorts of frequencies. Good, bad, or indifferent, linear will probably bleed (*splash*) other CB'ers in your area operating on other channels.

Another problem with many CB linears (primarily junkers produced without benefit of manufacturer's name) is that they tend to be vastly overpriced. Some I've seen constitute electrical safety hazards because of chintzy manufacturing practices and *el cheapo* parts, or parts not suitable for the jobs they have been given.

One of these junkers was brought into the office the other day by a reader who had it a week when it gave up the ghost. He had paid more than \$100 for the thing at a CB jamboree. It had no guarantee, he didn't even know where to dig up the guy who sold it to him.

Our lab people checked over the unit and said that the parts inside the thing looked as if they could have been picked up retail at any electronics store for about \$25—however undoubtedly some of them had been previously used. Construction-wise, it looked as if it were almost deliberately booby trapped to give its owner a few shocking moments—luckily it expired before it had the chance!

**ALL IN ALL**

It should be obvious that CB *footwarmers* are a rather poor way of becoming a bodacious operator.

Besides their technical limitations, Uncle Charles seems to be picking off linear users with increasing accuracy. Once caught, the CB'er often finds that the FCC will nit-pick over the whole scope of his/her CB operation, digging up all manner of other rule infractions to make matters all the worse.

Case in point: two CB'ers in Houston, a father and son (Handles: PENNY PINCHER and MONEY BAGS) got caught running heat. By the time the FCC buzzed through their lives they had 31 counts against them (overtime talking, too high an antenna, etc.). The maximum penalties are tabbed at \$500 per count.

Is it worth \$15,000 to run a *footwarmer*? Think about it.

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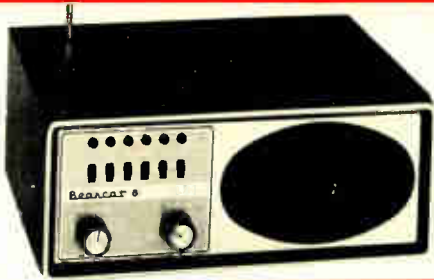
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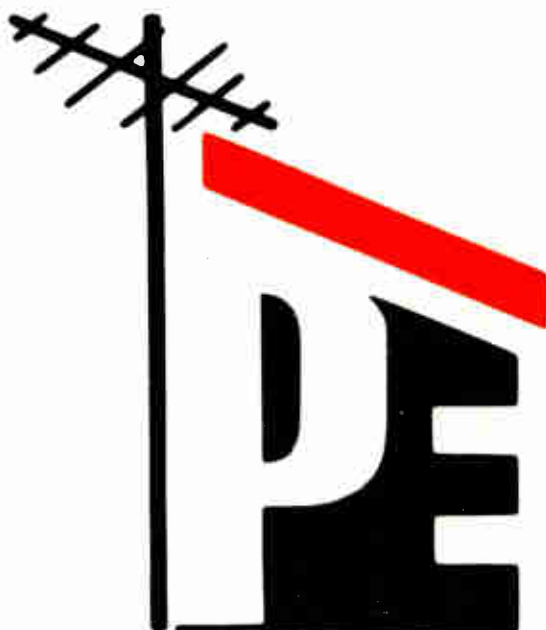
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# The Roots of CB!

## Our Anniversary Issue Special-- Meet The Man Who Says He's The "Father Of CB Radio!"

by **Dwight Boyer**

**N**EARLY every commercial field has its "father," usually a highly inventive person whose work has revolutionized an existing industry or created a new one.

But often the inventor gets lost in the fiscal scrambling and manipulating as the brain child skyrockets in popularity.

That's the way it has been for Cleveland's Al Gross, who conceived, developed and built the first CB radio, now used by more than 20-million Americans and millions of overseas operators.

People who never heard of Al Gross are using CBs, most assuming the radio is a product of new technology.

The CB story began in 1939 when Gross created the high-frequency walkie talkie.

"The pioneers are always forgotten," said Gross, "and usually broke."

But he met some interesting people along the ham radio road—Dick Tracy, Barry Goldwater, Arthur Godfrey, Herbert Hoover Jr., Gen. Curtis LeMay and Andy Devine.

"They were all able old-time 'hams'," said Gross.

Gross' affair with radio started on a trip to Buffalo with his parents aboard the lake steamer Seeandbee when he was nine.

"Like all kids I was restless and during the all-day trip I wandered up to the top deck where I discovered a room full of strange, humming equipment and a man

tapping out something on a telegraph key.

"It was the ship's radio room and the brass pounder, as they called radio operators, took me in and gave me a complete tour, even got me some lunch.

"From that moment I was a captive in the wonderful world of radio."

He obtained his amateur radio license at 17, and tinkering and experimenting, he designed a high frequency walkie talkie by 1939.

Word of his inventive genius spread and he spent most of the war years in Washington. Out of his work there came a VHF hand-held walkie talkie for the Office of Strategic Services.

Among other applications it enabled intelligence personnel on the ground to transmit information to flights of bombers.

He also developed the proximity fuse, a radio device incorporated in 40 millimeter shells and other ordnance.

The fuse sent out radio signals that bounced off plane targets, returned to the fuse and detonated the shell at a predetermined distance from the aircraft, spraying it with shrapnel.

The fuse also was used against the German buzz bombs that plagued England. The proximity fuse included the first adaptation of the printed circuit.

The capabilities of short range radio became so evident E. K. Jett of the Federal Communications Com-



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1 1/2 in. x 1 in., 2 digits - used in measuring instruments, not found in CB transceivers.
- **SOFT TOUCH CHANNEL CONTROL ON TRANSCEIVER**  
Not a rotary switch - automatically steps channels up in clockwise position and down in counterclockwise position.
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Outstanding stability  $\pm .005\%$  and extremely low spurious radiations.
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Obtained by using 2 ceramic filters, not found in CB transceivers — -70db at 10KHz and -80 dB at 20 KHz greatly reducing adjacent channel interference.
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A sophisticated circuit automatically reduces the power input to the final transistor when there is an antenna mismatch.
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If the DC supply is connected with reverse polarity a protective circuit blows a fuse and protects the rig.
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Automatically increases mic gain at low voice levels and suppresses large levels to maintain optimum modulation - very effective for distant contacts.
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Less than 2 billionths of a watt at the antenna terminal - greatly reducing one of the main causes of television interference.
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Automatic noise limiter for light noise and a specially designed 5 stage noise blanker in the RF stages for higher noise levels.
- **RF GAIN CONTROL**  
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**E. K. "Jack" Jett, FCC Commissioner and visionary**, whose story on his proposed CB radio service (SATURDAY EVENING POST MAGAZINE – 1944) inspired construction of the first CB units. Jett was later Vice President of a Baltimore TV station. He died about 10 years ago.

The FCC's first official announcement about a piece of CB gear being approved for commercial production, **March 25, 1948**.

FEDERAL COMMUNICATIONS COMMISSION PUBLIC NOTICE  
 Washington 25, D. C. 19741  
 FIRST TYPE APPROVAL GIVEN TO RADIO EQUIPMENT March 25, 1948  
 FOR OPERATION IN CITIZENS RADIO SERVICE

The Federal Communications Commission has issued the first certificate of type approval for equipment to be used in the Citizens Radio Service. It has approved a radio transceiver designed by the Citizens Radio Corporation, Cleveland, Ohio, to operate on the frequency of 465 megacycles.

Tests conducted in the Commission's Laboratory at Laurel, Maryland, indicate this unit's ability to comply with the provisions of Part 19 of the Commission's Rules Governing the Citizens Radio Service. The entire apparatus weighs approximately 39 pounds, with batteries, and is comparable in size to a camera and carrying case.

The issuance of this type-approval certificate is the result of several years of endeavor on the part of both industry and the Commission, and presages the advent of a new service which will be available to individual citizens for personal use in the band 460-470 Mc.

Because equipment particularly adapted for this service has not been generally available to the public, those stations now in operation are authorized as Class 2 experimental stations. However, the initial approval foresees the early availability of manufactured units suitable for this service, and the Commission has under consideration the establishment of additional rules to provide for simplified licensing for operation by individuals.

The certificate of type approval was issued pursuant to the Citizens Radio Service rules, effective December 1, 1947, which provide for such a procedure in order to permit the manufacture of suitable equipment prior to the promulgation of additional provisions establishing regular licensing. Provisions governing private short-distance communication, radio signaling, and control of objects by radio are in preparation.

Within the limitations imposed by the physical laws governing propagation of radio energy and the economic factors involved, the possible uses of this service are as broad as the imagination of the public and the ingenuity of equipment manufacturers can devise.

- FCC -

UNITED STATES OF AMERICA  
 FEDERAL COMMUNICATIONS COMMISSION  
 RADIO STATION CONSTRUCTION PERMIT  
 CLASS 1  
 PORTABLE AND PORTABLE-MOBILE: Within the State of Ohio  
 None  
 Subject to the provisions of the Communications Act of 1934, subsequent acts, treaties, and all regulations hereinafter or hereafter made thereunder, and further subject to the conditions set forth in this permit, including those contained on the reverse hereof, authority is hereby granted to:

AL GROSS  
 to construct a radio transmitting station in accordance with the following specifications:

CLASSIFICATION	TYPE	POWER	MODULATION	FREQUENCY	TELEPHONE CONNECTION
Composite	Experimental	100	A3 and Special		In accordance with Section 5.22

460-470 MHz

2. Frequencies that may be assigned from time to time by the Commission's Chief Engineer.

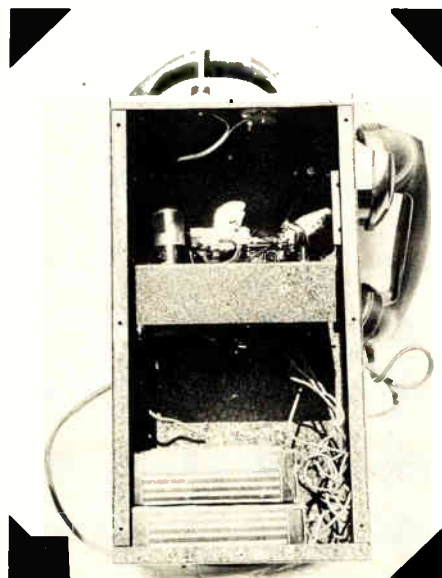
3. Power (watts): 100. a. Division A3 and special for frequency modulation (see below?)

4. Time of Operation: Unlimited, in accordance with Section 5.18.

5. To Communicate Authority is granted to communicate in accordance with Section 5.53 of the Commission's Rules, and to transmit such other related experimental operations as the Commission may require through the Engineering Department.

6. Earliest date of commencement of construction: September 30, 1945.  
 Date of required completion of construction: May 10, 1946

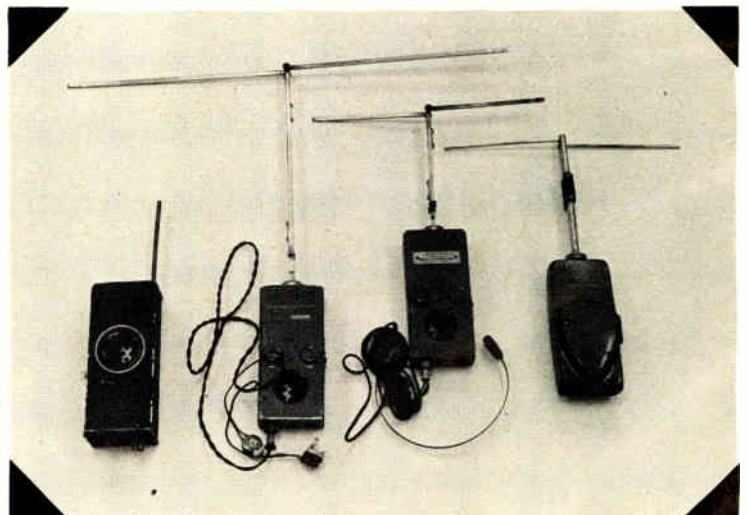
Dated this 10th day of September, 1945.  
 By Reception of the FEDERAL COMMUNICATIONS COMMISSION

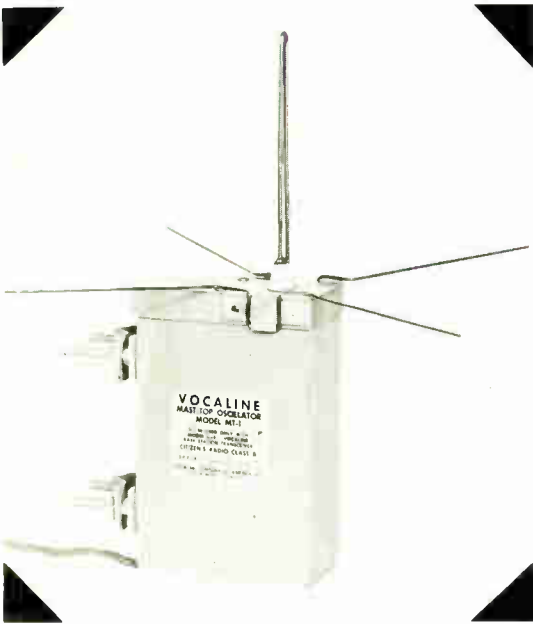


This 1947 experimental 465 MHz CB rig was designed by John M. Mulligan of Elmira, NY, while he was working for Motorola.

The construction permit to build the first CB rig, **September, 1945**, issued to Al Gross.

An assortment of Gross' early creations—all in the field of personal communications. On the far left is his 1939 ham radio walkie-talkie. Second from left is the 250 MHz unit designed in 1941/42 for OSS (spy) use. Second from right is the first FCC approved CB model, the CR-401, produced in early 1948. It was for the 465 MHz band. On the right is the version of the CR-401 as it was later produced by Stewart Warner.





Vocaline had a great idea—they had a model of their UHF CB rig which had the final RF oscillator of the transmitter mounted at the antenna in order to minimize coaxial line signal loss. This was about 1954. The antenna and RF oscillator were one single unit. This is a previously unpublished photo.



Here it is, in the flesh, a vignette from the world's very **first CB Jamboree**, held in early 1960 by the 5 Watt Wizards club of Queens, NY. The jamboree was held in New Jersey and attracted a large number of pioneer CB'ers. In the foreground on the left is a cut-down model of a coaxial antenna, a popular sky-hook of that era.

The fantastic **International Crystal "Traveler,"** the first truly portable 27 MHz CB 5-watt rig ever produced. It was a 2-channel unit which came out in 1960—however there were a multitude of problems (nontechnical) which prevented the unit from receiving the wide distribution it deserved.



**CB in Action!** Gross' early CB rig even has competition! Eventually a company called Vocaline came out with another 465 MHz CB set — here's one in use in the early 1950's.



A rare photo of an engineering prototype of the **E. F. Johnson Messenger 1**, one of the first sets to achieve major popularity on Class D CB—it was produced for more than 10 years. This photo shows how it looked while it was still being designed by Johnson engineers, circa 1960.

mission suggested civilian applications and proposed a Citizens Radio Communications Service.

Gross participated in a committee formed by the FCC to study Citizens Radio and promulgate rules and regulations under which a system might operate.

Gross formed Citizens Radio Corp. to design and develop CB equipment in the walkie talkie configuration.

When type approval by the FCC came early in 1948 he was ready for production and one of the first orders was for 25,000 walkie talkies for Montgomery Ward.

Soon the U.S. Coast Guard placed a substantial order. About this time, Chester Gould, creator of Dick Tracy, sought Gross out, presumably to investigate the possibility of outfitting Tracy with the walkie talkies.

Gross was also tinkering with an ultraminiature radio transmitter, one that could have fitted into a wrist watch case.

Inspired, Gould equipped Dick Tracy with a fantastic wrist radio. The two were inseparable and the sharp-faced detective made history with the gadget.

Immediately after FCC type approval of the first models for the public, Gross learned something about intrigue and industrial espionage.

News of the approval had scarcely become public record when a major radio manufacturer sent a vice president to Cleveland, incognito.

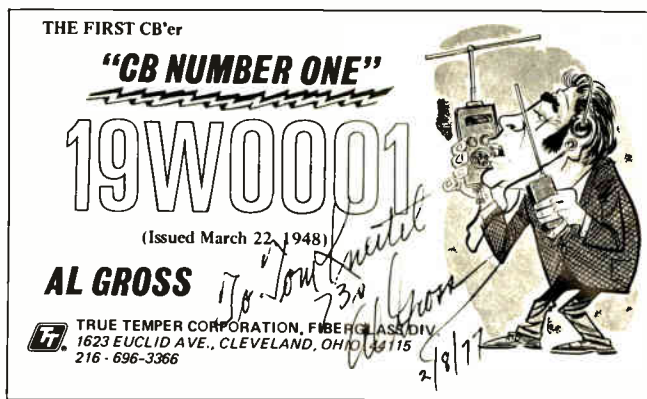
He struck up a friendship with Gross' secretary and spent two weeks wining and dining her, trying to pry out some of the secrets of the new device.

On a trip to Youngstown on the Erie-Lackawana Railway, with one of the line's executives, train problems prompted Gross to say things would be much simpler if there were instant communication between engineer and conductor. The official agreed. Gross produced, and that was the beginning of locomotive to caboose communications.

In 1949 Gross sold his firm to Stewart Warner Corp., accepting a royalty deal over a limited period of years.



Here's Al Gross (left) with Gary Moore on the TO TELL THE TRUTH TV program last December. Gross challenged the panel as the "inventor of CB radio."



Here's some wallpaper from Al Gross, showing the unusual CB call sign he had back in 1948. Today he is licensed as KBU1052. He is also licensed on the ham bands as W8PAL, he's been a ham since 1935!

"It seemed good at the time," he said. "But you must remember that it was still something new and the sales potential speculative.

The big boom in CB came much later, really only in the past few years. Taxes and inflation quickly dissipated the royalties which remained the same modest figures despite escalating living costs.

Then too, when a creative and inventive person gets involved with running a company he finds that he spends all of his time on mundane affairs and managing people, not doing what he wants to do. It wasn't for me."

The same philosophy prevailed in 1956 when he designed and developed the first selective call radio pocket paging receiver and transmitter. He sold out to a New England firm.

"The logical application was for doctors who might be anywhere in or around a hospital but subject to phone calls," he said.

"But we at first met adamant resistance from the doctors. It eventually worked out and now they wouldn't be without them. Why? Because it's money in their pockets."

Through 1973 he was involved in developing miniaturized components for missiles and satellites. During this period he also developed the first battery powered calculator.

"The public awareness of the tremendous CB potential didn't really surface until the big, nationwide truck strike of a couple of years ago.

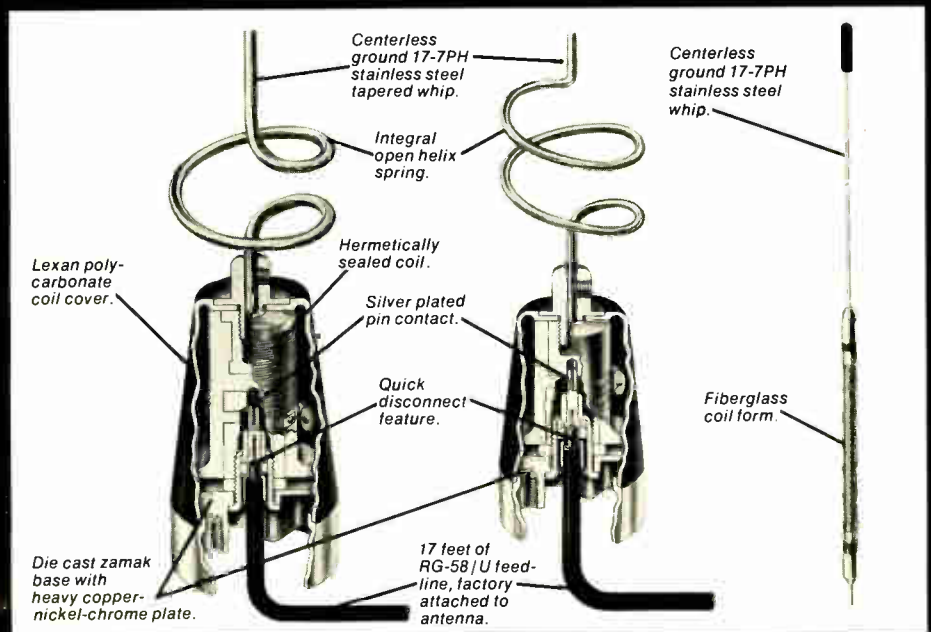
"Then, they witnessed how the nation's truck transportation system could literally be paralyzed, primarily by truckers planning and following instructions through their CB radios.

"I was first in many things," said Gross. "But somehow, because of the times, inflation or being uninformed in financial manipulation or whatever, I got left at the post.

On the other hand, the fantastic boom in CB radio has created an unbelievable demand for knowledgeable service work.

Today, Gross is an executive with the Fiberglass Div. of True Temper Corporation, Cleveland, Ohio. He's still an active CB'er!

# What's so special about our new CB antennas?



No other CB vehicular antenna looks like a Phelps Dodge, installs like a Phelps Dodge, works like a Phelps Dodge. Now, a new standard has been set against which all other CB antennas will be judged.

Take a hard look at the design and construction of both our base loaded and center loaded models. Bases offer a classic, sure-to-be-copied configuration in spectacular satin black with high lustre chrome banding. The bridge between the base and the whip is the whip itself, turned into an open helix coil, not an add-on spring. Bases are two part, adapt easily to any type of in-

stallation, with single-turn quick disconnect a welcome feature. With the exception of the magnetic mount, all mounts are constructed of polished, passivated stainless steel. And, Phelps Dodge antennas are designed specifically for dual 23 and 40 channel use.

Now for the good news: Phelps Dodge antennas cost so very little more, why settle for less?

Write today for fully descriptive literature and prices: Phelps Dodge Communications Company, Route 79, Marlboro, New Jersey 07746. **phelps dodge** Communications Company

# Everything.

# Are You A CB-Aholic Can You Pass This Simple Test?



by Tom Kneitel/ Tomcat  
Editor of CB Radio/S9

I ain't addicted! I can quit anytime I wanna. Now, shut up! I got the PURPLE MOOSE on ten.

**T**HERE seems to be a lot of talk today about helping those who are alcoholics, compulsive gamblers, overeaters, drug addicts—maybe its about time that society took pity on the poor *CB-aholic*—my term for those who are hopelessly addicted to CB Radio. Maybe we could even get Blue Cross and Blue Shield to come across with some greenstamps towards affecting individual cures!

Are *you* a CB-aholic? It creeps up on you, you might not even realize it until it's too late—shunned by spouse and kids, looked at behind your back by co-workers, thought of as “sort of strange” by your neighbors. Is it too late for you?

# Answer

## These Simple Questions :

1. Do you refuse to answer the telephone when you are using your rig?
2. Do you let the CB rig play when you have company over to the house, sometimes even talking over the rig at those times?



Lucky Lady, it would be bodacious fer sure if you'd 10-4 to be my XYL. Bring it on back, guy. 4-10?

3. Have you ever refused an invitation to a social or family function because you would rather use your CB?
4. Do you speak in CB lingo even when on the phone or when speaking to someone in-person?
5. If your kids tell you that your CB'ing is messing up their TV reception, do you usually tell them to turn off the TV set?
6. When friends are with you in your car, do you insist on playing your CB so loudly that it overrides the possibility of any conversation by those riding with you?
7. Do you leave the CB running while you are watching TV and/or eating supper?

8. If, for some reason, you are forced to use your car without benefit of listening to CB radio—do you become nervous, uneasy, irritable, apprehensive?

9. Do you find that, regardless of whom you are speaking to in conversations with family or non-CB'ing friends, that you eventually bring the conversation around to the topic of CB radio?

10. If you are accused of being too addicted to your CB—do you immediately become defensive about your interest in CB, offering innumerable excuses and alibis?

Now you can score yourself—each question you answered *yes* gives you 10 points. If you scored as low as 20, then you are heading towards a CB addiction problem; 30 to 40—you're in the early stages of CB addiction. Anything you scored 50 or above is bad news—not only for you, but for those who have to put up with you—you're a confirmed *CB-aholic!*

What can you do about it? Recognize the problem—try to overcome it—back off a little at a time. Maybe someday they will come up with *CB'ers Anonymous*, but until they do, you're on your own! 10-4, goodbuddy?



Aw c'mon, Billy! It'll only take about an hour and I'd really like to have you there.



# ON THE COUNTERS



**40-CHANNEL**

## **CB SETS WITH TWO-YEAR WARRANTY**

Channel Master has introduced two 40-channel CB transceivers featuring Phase Lock Loop circuitry. Both sets are covered by a new two-year warranty on parts and labor.

The top of the line model, the Super Phase 40, has a switchable noise blanker with automatic noise limiter, which instantaneously eliminates all ignition pulse noises and suppresses background noise. Also included are full range RF control, full range PA volume control, delta tune (electrical fine tuning to  $\pm 1.5$  KHz), large LED channel numerals, LED modulation indicator, and a limiter that prevents distortion caused by overmodulation. An illuminated S/RF meter monitors strength of incoming signals and output power. The transmitter delivers 4 watts of power to the antenna.

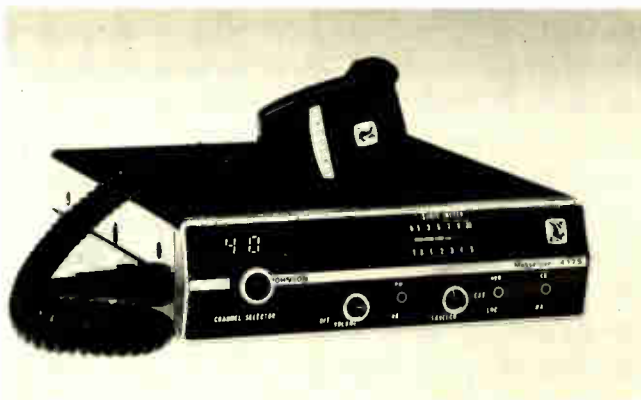
A lower priced version with many of the same features, the Phase 40, is also available. Both models have anti-theft alarms which set off the vehicle's horn if transceiver is removed, and reversible polarity—a unique "floating" chasis allows the transceiver to be installed in any negative or positive 12 volt system.

Additional information is available from Channel Master distributors, or by writing Sales Department, Channel Master, Ellenville, N.Y. 12428 or mark number G01 on Reader Service Card.



**40 CHANNEL XCB-77**

Xtal Products has announced the introduction of its XCB-77, an under-dash CB transceiver with LED channel indicator and full-feature controls. These include ANL, PA, Squelch, RF Gain and Delta Tune. The Xtal XCB-77 also features superior performance characteristics and a large S/RF meter. Suggested retail price is \$179.95. Mark number G02 on Reader Service Card.



**DELUXE 40-CHANNEL JOHNSON**

E. F. Johnson Company has announced the introduction of a new top-of-the-line 40-channel CB radio with the most advanced performance features the Company has ever offered. Included in the deluxe new radio are many exclusive Johnson engineering innovations. Named the "Messenger 4175", it is designed as a no-compromise radio for those who require maximum performance under all types of operating con-



For Spare Time Income, Your Own Business or a Career...

# LEARN TO SERVICE COMMUNICATIONS/CB EQUIPMENT...THE NRI WAY

**Career opportunities are opening up fast for the man trained in communications.**

The field of communications is bursting out all over. In Citizens Band alone, class "D" licenses grew from 1 to over 2.6 million in 1975, and the FCC projects about 15 million U.S. CB'ers by 1979. That means countless careers in design, installation and

maintenance. Start training now, the NRI way, to get your FCC license and qualify for one of these openings.

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

The 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 digitally-synthesized 400-channel VHF transceiver and AC power supply. This 2-meter transceiver gives you "Power-On" training. Then we help you get your FCC Amateur License with special instructions so you can go on the air.

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 covers AM and FM Transmission Systems; Radar Principles; Marine, Aircraft, and Digital Electronics; and Mobile Communications. You must earn your first class radio telephone FCC license or you get your money back.

**CB Specialist Course now available**

NRI now offers a special course in CB Servicing. You get 37 lessons, 8 reference texts, your own CB Transceiver, AC power supply and multimeter . . . for hands-on training. Also included are 14 coaching units to make it easy to get your commercial radio telephone FCC license—enabling you to test, install and service communications equipment.

**Over a million men have enrolled with NRI**

Send for the free NRI catalog and discover why more than a million men like yourself have chosen the NRI way the right way to get ahead. Read how you learn from 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.

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ditions. The long list of Messenger 4175 features includes the following:

—*Exclusive Johnson "X300D" PLL circuit.* The complete PLL circuit is contained in a single, reliable IC chip. Three crystals are used for long term stability and precise accuracy on all 40 channels.

—*Exclusive Johnson dual crystal filtering* for maximum freedom from adjacent channel interference.

*Local/Extended/Normal control* permits extra sensitivity for very weak signals and extra protection against overload from very strong signals.

—*Exclusive Johnson "Power Bar" meter* has bright red LED segments recessed behind a diffuser panel. Totally solid-state, the meter can be read at a quick glance. It also eliminates viewing angle errors encountered with conventional meters. With the radio fully squelched, the Power Bar can serve as a silent monitor, instantly flashing, when a call is on the channel.

—*Digital channel readout with automatic brightness control.* A photocell, recessed behind the display panel, automatically adjusts the brightness of the LED channel display for day or night viewing.

—*Exclusive Johnson TANL (Tapered Automatic Noise Limiter)* adjusts itself automatically to varying signal conditions to produce the optimum combination of noise limiting and voice fidelity.

*Built-in noise blanker with on/off switch* offers extra protection from severe automotive impulse noise interference, such as experienced in crowded urban freeway situations.

—*Exclusive Johnson speech compression circuitry* selects the most intelligible voice frequencies and compresses those signals to produce higher than average modulation for extended transmit range.

The Messenger 4175 also includes a PA function, external speaker provision, and Johnson's "voice tailored" audio system which contributes to the radio's exceptionally quiet receiver characteristics. It operates from either negative or positive ground, and an AC power supply is available for base station operation.

Highlighting the Messenger 4175's styling is its totally new, crisp, professional cabinetry which is designed to blend with modern vehicle-interiors. Like all Johnson Messenger radios, it is U.S.-made and backed by a 1-year parts and labor warranty with over 1,000 Authorized Service Centers nationwide. Its suggested retail price is \$249.95. Full information on the new Messenger 4175 is available from Johnson CB dealers or by writing to: Personal Communications Division, E. F. Johnson Company, Clear Lake, Iowa 50428 or mark number G03 on Reader Service Card.

#### 40-CHANNEL CB TRANSCEIVER

Sharp Electronics Corporation's new 40-channel CB transceiver CB-2260 has Phase Locked Loop circuitry, a built-in range boost circuit, and an easy-to-read illuminated channel indicator with a red light for channel 9.



Other features include a ceramic filter for sharp adjacent channel rejection, a variable squelch control/PA tuner, switchable Automatic Noise Limiter, 3-position Delta tuning, a signal/RF power meter, a ceramic filter for sharp adjacent channel rejection, external speaker and PA jacks, and a detachable microphone. Harmonic suppression exceeds 60 db.

The unit carries the Sharp Electronic standard one year limited parts and labor warranty. It was among the first CB transceivers to be type accepted by the FCC.

Suggested retail price is \$139.95.

Mark number G04 on Reader Service Card.



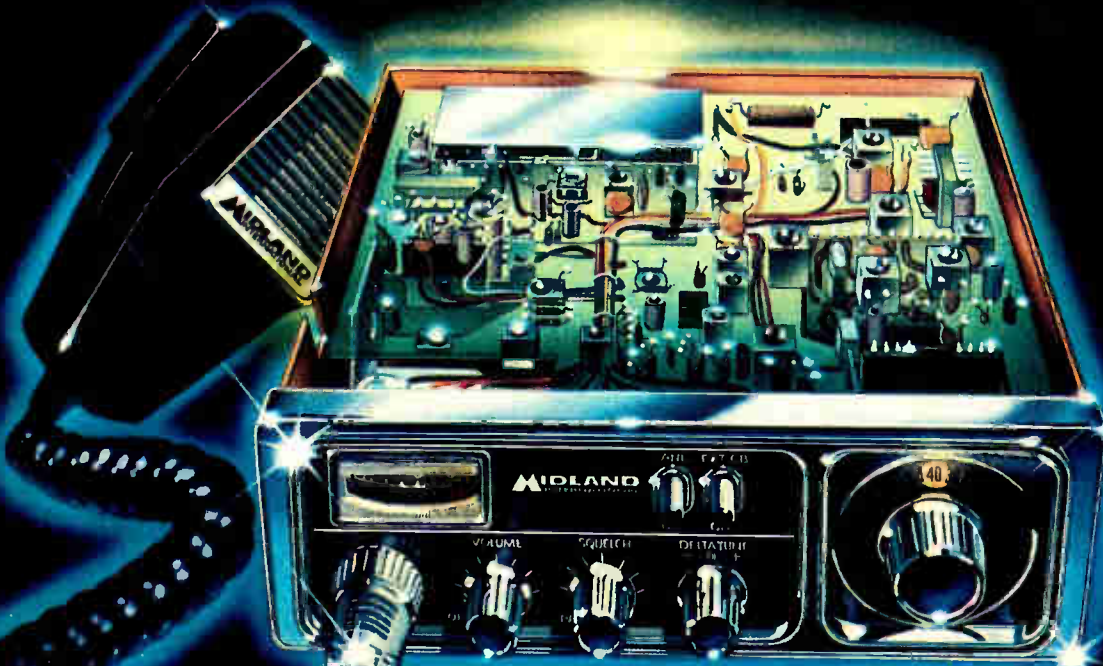
#### BASE STATION MICROPHONE

The Astatic Corporation, announces the introduction of the 1104C, a new modernistic designed pre-amplified base station microphone with balanced performance and an attractive appearance. A choice of 5 colors are available.

The Astatic 1104C features base-mounted slide controls that enable adjustment of the high gain amplifier to the proper modulation level and tone quality for individual voices. The Astatic 1104C provides intelligible transmission and talk power for each operator. An adjustable master gain control prevents overmodulation and distortion. Output impedance is

# MIDLAND POWER

IT'S WHAT YOU GET WHEN YOU RUN WITH NUMBER 1. MIDLAND CB.



## WE GOT TO THE TOP ON PURE GUTS.

Consistency. If one word can sum up Midland's rise to Number 1 in CB, that's it.

We've got to know that the ten-thousandth Midland will

perform every watt and ohm as reliably as the first Midland off the line.

To make sure, we use computer technology throughout the manufacture of all our new 40-channel models.

In the assembly and integration of our state-of-the-art circuitry.

In the ultra-fine tuning of those circuits.

And in the final testing of your new 40-channel Midland CB, so you know it'll deliver,

right out of the box.

Add to that Midland's 15 years' experience in CB, Midland's warranty and convenient authorized service centers, coast to coast.

Pure guts. Pure reliability. Pure Midland Power. That's what you get when you run with Number 1.

For your free, full-color, 24-page 1977 Midland CB brochure, write: Midland International, P.O. Box 12737, North Kansas City, Mo. 64116

"RUN WITH NUMBER ONE"

*ewm*



### MIDLAND CB

A member of the Beneficial Corporation family.

Shop for these active living products from Midland International: Benchmark Tools • Goodwin Sporting Goods • Medallion Car-Sound Products • Midland Television • Young World Toys.

compatible with inputs of all commercial transmitter transceivers.

This model is powered by a 9 volt replaceable battery, and has a six-wire coil cord for relay, electronic or virtually any type of hookup. During receive, the audio circuit is open.

List price \$83.00.

Mark number G05 on Reader Service Card.



### TOUCH-COM 40

SBE, Inc., is introducing the Touch-Com 40, a unique 40-channel CB transceiver with controls for all key functions and an LED readout combined in the microphone head.

According to SBE president, David Thompson, all normal CB functions on the Touch-Com 40 are controlled from the microphone, offering drivers extra convenience and safety during CB communications. Two up/down buttons on top of the microphone control channel selection—one for advancing to higher channels, and the other for down-channel selection. By momentarily pressing the appropriate button, the unit will automatically step upwards or downwards one channel at a time. Holding either button down will automatically step through all 40 channels. Channel readout is on the microphone, and features large, base-station size LED's, polarized for easy daylight viewing. Full range volume and squelch thumbwheel controls are located on the right side of the microphone. A push-to-talk switch is on the left.

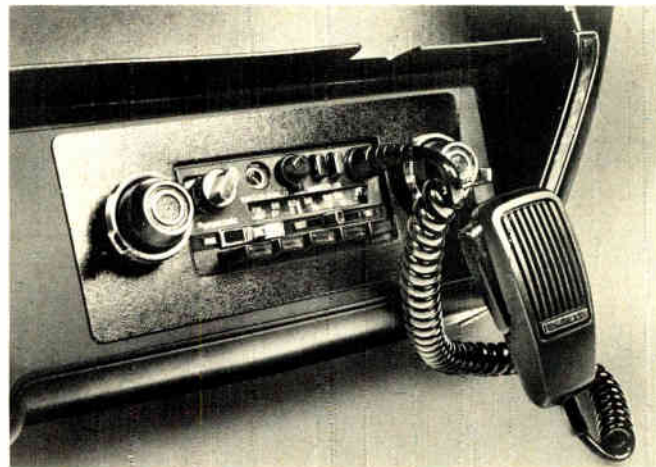
The Touch-Com 40 includes the famous SBE "Formula D" circuitry, with phase-lock-loop digital synthesis for precise frequency, accuracy and stability on all 40 channels. A 4-pole ceramic I.F. filter assures sharp selectivity and adjacent-channel rejection in the double-conversion receiver section. Field Effect Transistors in the receiver RF stage lead to optimum sensitivity and a high signal-to-noise ratio. Receiver automatic gain control yields smooth, undistorted audio under varying signal conditions. Audio tone is adjustable. The transmitter section features maximum legal output power, and the exclusive SBE "Speech-Spander" circuit for automatic control of modulation for varying speech levels.

Front panel controls on the Touch-Com 40 are:

audio tone, public address volume, local/distance switch, delta tune, "on-air" transmit light, and a large illuminated combination power output/S meter.

The unit operates on either 13.8 DC positive or negative ground systems.

Further information is available by writing SBE, Inc., Dept. P., 220 Airport Blvd., Watsonville, CA 95076, or mark number G06 on Reader Service Card.



### IN-DASH CB

Panasonic's Model CB-B1717, with four-way adjustable shafts, covers 23 CB channels and features a selector switch with channel indicator, RF output power of 3.5 watts, a P/S meter that indicates output when transmitting and the strength of the incoming signal when receiving, a variable squelch control that reduces noise levels, and Delta tuning that corrects any incoming signal that is not received at precise frequency. The unit also includes a standby monitor that permits reception on CB calls while listening to standard AM or FM broadcasts, an automatic noise limiter, and a detachable microphone. The radio receiver features an AM/FM slide bar selector switch, pushbutton and manual tuning, two-way balance control and a stereo indicator light. Available for immediate delivery. Price: \$299.95.

Mark number G07 on Reader Service Card.

### MINI-40

Radio Shack has introduced a new 40-channel CB two-way radio that will sell for under \$100.

The Realistic TRC-468 "Mini-40" CB Transceiver features PLL circuitry for full 40-channel operation and an automatic modulation gain control circuit which is said to provide 100% modulation without the use of a power microphone.

The Mini-40 is FCC type-accepted and certified. Rated RF power output: 4 watts maximum. An adjustable squelch control silences background noise and a built-in automatic noise limiter (ANL) reduces ignition-type interference.

Other features of the compact transceiver include: illuminated channel selector, LED modulation indica-

# Shakespeare's Big Stick<sup>TM</sup> 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 246,  
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Ontario



tor, external speaker jack, plug-in dynamic microphone and universal mounting bracket. Operates on 12 VDC, positive or negative ground electrical systems. Size: 1 7/8 x 5 5/8 x 8 5/8".

The Realistic TRC-468 Mini-40 40-channel CB two-way radio is priced at \$99.95.

Realistic CB radio equipment and accessories are available exclusively from Radio Shack stores and dealers, nationwide. Mark number G08 on Reader Service Card.



### THE LION™

Pearce-Simpson's Lion 40 mobile CB transceiver is a deluxe full-feature set with LED channel read-out, exclusive HetroLock™ circuitry for precision performance, and three-position Receiv-O-Slide™ frequency variance capacity.

The light emitting diode selector readout flashes the number big and bold as the operator makes instantaneous choice of any of the Lion's 40 channels.

HetroLock™, a technological break-through, employs only 3 crystals to keep the Lion on precise FCC frequencies. It's far more reliable than conventional systems and assures frequency stability approaching laboratory instrument standards.

Receiv-O-Slide™ varies frequencies about 1 kHz to pull in other stations operating slightly "off freq.". But this special tuning doesn't affect the transmitter's precision operation.

The receiver features extremely-sensitive circuitry for weak signal pick-up, a low-noise RF stage, auto-

matic noise limiter, noise blanker, ceramic filter, external speaker, and PA jacks.

An integral SWR/CAL/RF/S meter gives relative strength of incoming signals regardless of SWR/CAL/RF switch setting. It also measures transmitter power when in the RF position.

The CB monitor switch enables the CBer to listen to CB calls through the PA speaker when it's connected to the PA jack. The volume control power switch also controls output level from the CB external speaker when receiving, or from a PA speaker when connected to its jack.

The transmitter incorporates highly-reliable silicon transistors for trouble-free performance under extreme environmental and operating conditions.

The Lion operates off either positive or negative ground. Its low current drain makes this set ideal for boating use as well as for cars, trucks, and recreational vehicles. A 12 VDC power cord and mounting bracket are included with each Lion.

Although the Lion will work into an antenna system having an SWR as high as 3:1, the SWR should be as near 1:1 as possible for maximum communications. We recommend Pearce-Simpson's Bandmaster™ mobile antennas for maximum efficiency on land and our Foremast™ CB marine model for boating.

Lion's suggested retail: \$249.95. Mark number G09 on Reader Service Card.



### NEW UNIVERSAL CARRYING CASE FOR CB RADIOS

A new Universal Carrying Case for CB mobile radios is being introduced by the Motorola Communications Group Parts Department as the ultimate in security. The case permits easy removal of a CB mobile radio so it can be taken with the driver. Separate compartments within the case hold microphones, the power cable and a portable antenna.

As an extra security feature the carrying case is unobtrusively constructed. By keeping the outside free of ornamentation, the radio user will be the only person who realizes that the case contains a CB radio.

The Universal Carrying Case is designed so the mobile radio can be operated without removing the unit from the case. Openings at the top and bottom

# CLEARLY THE PROFESSIONAL'S CHOICE: JOHNSON CB.



## A 66% lead over the next brand. That's how independent truckers rate Johnson CB.

Independent truckers. The guys who own their own rigs and equip them the way they like because that's "home" as they roll more than 100,000 miles every year.

Performance and reliability mean a lot to these professionals.

What kind of CBs do they buy? Johnson... 66% more of them ride with a Johnson CB than the next leading brand, according to a recent survey\*.

And for 1977, we've got a whole new line of 40-channel CBs for truckers, for you and for everybody who's serious about quality. CBs with more features and more value per dollar than ever before.

Exclusive features like our X300D single chip PLL frequency synthesis circuitry for greater

accuracy and reliability. And our exclusive Tapered Automatic Noise Limiter that adjusts itself to changing noise conditions. Or the brightest idea in S/Rf meters yet—Johnson's PowerBar LED meter that can be read accurately at a glance from any angle.

Johnson's electronic speech compression gives maximum transmit range and Johnson's voice-tailored audio circuitry delivers quieter, better reception.

Of course, you still get Johnson's solid, made-in-America quality and reliability. Plus the best warranty/service protection in CB—one year on parts and labor with more than 1,000 Authorized Johnson CB Service Centers nationwide.

Johnson CB. Clearly the professional's choice.

\*Independent Trucker Survey results available upon request.



## JOHNSON

PERSONAL COMMUNICATIONS DIVISION  
E. F. JOHNSON COMPANY, CLEAR LAKE, IOWA 50428  
In Canada: A. C. Simmonds & Sons, Ltd.

Made in U.S.A.

of the case allow the speakers to be heard, and a large opening at the back of the case permits antenna and power connections. The front flap folds down so the radio controls and microphone jack are readily accessible.

Designed for use with all of the major brands of CB mobile radios, the case measures approximately 3 by 9 by 12 inches. A heavy duty handle is connected to the case, which is covered with durable TEXION vinyl. Texion vinyl is a space-age material that many people mistake for genuine leather.

For more information about Motorola's Universal Carrying Case, contact Barbara Bennett, Literature Distribution Center, Motorola Communications Group, 1301 E. Algonquin Rd., Schaumburg, IL 60196, or mark number G10 on Reader Service Card.



#### NEW PRE-AMPLIFIED POWER MICROPHONE

Newest in the broad line of CB accessory equipment from Kris, Inc. is the "Big Mike" pre-amplified power microphone. Big Mike is designed to replace the original factory microphone to obtain the full performance CB's are designed to deliver.

Housed in a rugged, molded case, Big Mike is easy to use. An adjustable gain control on the back of the microphone accurately sets modulation level. Included is a coiled cord with factory wired connector to work on both relay or electronic switching. The microphone element is a dynamic omni-directional type with a factory rated preamp gain of 0-26 db. The unit is powered by a 7 volt battery (Eveready E-175 or equivalent). Suggested list price is \$29.95.

For more information, write to Kris, Inc., Pioneer Road, Cedarburg, WI 53012. Phone (414) 375-1000, or mark number G11 on Reader Service Card.

#### CB HELMET

SUPEREX ELECTRONICS CORPORATION announces the introduction of a new motorcycle CB helmet microphone and speaker, THE CB-900.



The aerodynamically engineered microphone is attached to a flexible gooseneck and easily clamps onto the helmet. A thin, specially designed high-definition earspeaker mounts inside the helmet and does not interfere with outside sounds. The push to talk switch is mounted on the handlebar. This insures maximum safety in that the driver's hands remain at all times on the grips. Also provided is a special connector for quick disconnect from the CB unit.

The CB-900 is available through local motorcycle and CB dealers and retailers for \$45.00. For further information on the CB-900 and other SUPEREX products, contact Marvin Paris, Marketing Director, SUPEREX ELECTRONICS CORP., 151 Ludlow St., Yonkers, N.Y. 10705, or mark number G12 on Reader Service Card.



#### REACT HELP FLAG NOW AVAILABLE

A special flag for motorists in distress to signal a request to call REACT on CB Channel 9 is now being distributed by local REACT teams. The REACT Help Flag is made of highly visible orange reflective vinyl with the word "Help" and the REACT emblem printed in black. It is made to roll up snugly against an auto side window so that it faces the road at





# That bad language on your CB may not be bad language.

## It may be bad CB.

Every CBer knows who the enemy is. Static.

And while nobody yet has come up with a way to kill it, Pace has hurt it. A lot.

Because every Pace CB has a minimum of six noise suppressors built into it. Some as many as nine!

So, while there's still no such thing as noise-free CB, a Pace comes as close to it as you're going to get.



PACE 40 CHANNEL MODEL #8015

Pace. We're very bluenosed about bad language. So we're doing everything we can to clean up the CB airwaves.

**pace CB**  
PACE CB/PACE TWO-WAY RADIO PRODUCTS  
 BY PATHCOM, INC., HARBOR CITY, CA 90710

**When you've got a Pace 40-channel CB, you've got the world by the ears.**

For your convenience there are seven Pace regional warranty centers, plus more than 300 independent Pace service repair centers around the nation.

# Robyn makes it right

Robyn makes everything you need for your own complete CB system: 40 channel CB transceivers, top-notch CB accessories, base and mobile CB antennas . . . all engineered to provide the reliable, long lasting performance you want.

Every Robyn base, mobile and single sideband 40 channel CB puts you on the air with the maximum legal broadcast power—4 watts, and 100% modulation. And each Robyn CB has its own special group of extras: You can choose models with features like microphone gain control, remote channel selection, intercom, digital channel readout or special BFO feature for reception of single sideband stations.

With Robyn accessories, you can really customize your CB system. Choose from three base modules that let you use most Robyn mobile CBs as base stations; check your CB performance with one of Robyn's professional quality transceiver testers or

round out your CB installation with Robyn microphones and handy hardware. Since your CB's performance is only as good as the antenna it's coupled to, Robyn makes a wide range of base and mobile CB antennas—all designed the right way, to provide you with full transmit and receive power. There's a Robyn antenna for virtually any vehicle and every budget.

If you like CB, you may enjoy monitoring police, fire and emergency activities with one of Robyn's fine crystal-controlled FM scanners.

Whatever you buy—one of the many Robyn 40 channel CBs, a Robyn FM scanner, antenna or accessories—Robyn makes it right, so you know that you'll be receiving the extra value and satisfaction that Robyn has been giving people for more than 15 years.



**ROBYN**  **INTERNATIONAL INC.**  
10901 Northland Drive, Rockford, Michigan U.S.A. P.O. Box 478, 49341, TWX 22-6393 (616) 866-1557

*Over 15 years of CB leadership*

right angles for maximum visibility.

All CB'ers who see these flags displayed on a stalled vehicle are asked to call their local REACT teams on Channel 9. In some areas, local law enforcement people are also monitoring Channel 9 and they would be interested in such reports. This flag identifies a motorist in distress who wants assistance through citizens band radio.

While primarily aimed at motorists who are not equipped with CB, the REACT Help Flag is also of value to CB'ers who may find their radios are inoperative when they need them the most—when stalled on the highway.

If you would like to obtain a REACT Help Flag, contact your local REACT team, who are distributing the flags as a combined community service and local fund-raising project. If you cannot obtain the flag from your local REACT Team, REACT International will provide it directly to an individual who contributes \$5.00 or more to REACT International, Inc., 111 E. Wacker Drive, Chicago, IL 60601. Contributions to REACT may be considered deductible for Federal Income Tax purposes.

Mark number G13 on Reader Service Card.



#### 40 CHANNEL "AIRCOMMAND" UNITS

Three top quality 40 channel Citizens Band radio units—to be marketed under the trademark "Aircommand" have been introduced by Superscope, Inc., the largest American-owned manufacturer and distributor of stereo high fidelity components. The Company's entry into the burgeoning CB market further extends the range of its long-established expertise in the manufacture of audio home electronic products.

In providing the most advanced, reliable 40 channel units, Superscope has included impressive features in all its Aircommand CB models. The top-of-the-line CB-640 is equipped with an Emergency Channel 9 Scanner. This unique feature constantly monitors emergency Channel 9, and an audible beep indicates when someone is transmitting so that this channel may be tuned in and possible assistance alerted.

A LED Meter Display monitors standing wave ratio (SWR) modulation and incoming or outgoing signal strength, and an auxiliary input jack allows music to be played from a tape recorder or FM radio through a public address speaker.

"Superscope was not burdened by a changeover from the manufacturing of 23-channel units, and, as a result, we were able to focus on the development of 40 channel CB radios with many advanced features, thus insuring the utmost in quality and performance," according to Fred C. Tushinsky, senior vice president of marketing and sales.

The CB-340 model is equipped with a Noise Blanker (NB) switch which eliminates annoying repetitive noises such as ignition, spiking, and a RF Gain Control to assure the clearest possible reception. A Delta Fine Tuning control pinpoints signals which are off frequency and helps reject adjacent channel interference.

The economical CB-140 is also equipped with advanced features common to the CB-340 and CB-640. These include:

- The legal maximum limit of 4 Watts of RF output power.

- Advanced mike preamp and compressor designs which provide 100% modulation capability so that messages are transmitted audibly regardless of input volume.

- A full 6 Watts of audio power, teamed with a built in 4-inch speaker, overcomes any freeway wind noise and insures that the weakest signals come through clearly.

- Dual-Conversion Superhetrodyne Receiver with Dual-Cascoded Ceramic Filters eliminates unwanted signals and provides unsurpassed selectivity and sensitivity.

- LED Channel Selector Indicator.

Aircommand is a registered trademark of Superscope, Inc., worldwide manufacturer and distributor of Marantz stereo high fidelity components and Superscope home entertainment products. The Company is also the sole United States distributor for those Sony model tape recorders that include stereo cartridge, reel-to-reel and stereo cassette decks. Mark number G14 on Reader Service Card.



#### UNDER-DASH TRANSCEIVERS

Five new 40-channel Citizens Band Under-Dash Mobile Transceivers will be introduced in 1977 by Sparkomatic Corporation, one of the country's leading creator/designer/manufacturers in the automotive aftermarket industry.

Models CB-1040, CB-2040 and CB-3040, retailing at approximately \$129.95, \$159.95 and \$179.95, respec-

tively, all feature an RF power output of four watts (maximum FCC limit), 40 channels and PLL digital frequency synthesizers. All units include LED digital readout, illuminated S/RF meter; dynamic detachable microphone, mounting bracket, all hardware and positive or negative ground power supply system.

The CB12040 and the CB-3040 share the following features: channel selector touch control bars, top touch bar moves channels forward, lower touch bar moves channels in a reverse sequence. Keeping either bar depressed for one second will automatically sequence channels. Jacks for PA speakers or external speaker are also included.

In addition, the CB-2040's controls include volume/on-off power switch, variable squelch and delta tune. Its switches include automatic noise limiter (ANL), noise blanker (NB) and PA/CB. Also, the model includes transmit and receive lights.

CB-3040's unique features include: a memory circuit which programs any desired channel so that the transceiver can be tuned automatically to that channel with the "memory" button. Controls and switches include a volume/on-off power switch, variable squelch, RF gain, automatic noise limiter (ANL), noise blanker (NB), calibrate/RF/SWR and PA/CB. The CB-3040 also has front panel indicator lights for transmit, receive and defective antenna warning.

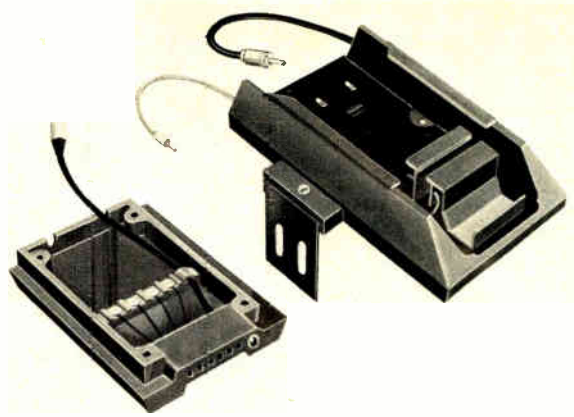
Retailing at approximately \$129.95, the Model CB-1140 is a unique combination of the following features: RF power output four watts (maximum FCC limit), 40 channels—crystal controlled, illuminated signal strength and radio frequency output (S/RF) meter, transmit modulation light, variable squelch control, automatic noise limiter (ANL), public address (PA/CB) switch, external jacks; PA speaker/external speaker, screw-type detachable dynamic microphone, positive or negative ground power system and mounting bracket and hardware.

Retailing at approximately \$149.95, Model CB-4020S combines RF power output of four watts (maximum FCC limit), 40 channels, PLL synthesizer, illuminated channel selector, volume control/on-off power switch, full-range variable squelch control, large illuminated signal strength and radio frequency output (S/RF) meter, delta fine tuning, variable intensity modulation light receive and transmit lights, automatic noise limiter switch (ANL), noise blanker switch (NB), and separate public address (PA) switch. Other features are external jacks for PA or external speakers, screw-type dynamic detachable microphone, positive or negative ground power system and mounting bracket hardware. Mark number G15 on Reader Service Card.

### SUPER SLIDE

Super Slide is a classy, precision engineered slide mount developed by Gamber-Johnson, Inc.

The Super Slide is a radical departure from current slide mount technology which has been identified with



such widespread problems as SWR loss and final stage burnout. According to an independent laboratory evaluation the new slide is "far superior to competitive models tested."

Stylishly crafted in finely textured exceedingly tough black plastic, the Super slide looks attractive whether the radio is in or out. There are no exposed contacts.

Super Slide is available in three models: (1) for CB radios, with coax antenna and power and speaker circuits, (2) for CAR STEREOS, with power and speaker wiring and (3) UNWIRED for those who don't want to wire through the mount.

The CB version has a fully shielded antenna. The power and speaker circuits use high quality pin-and-socket connectors. Laboratory test reports state there is "no detachable SWR loss" with Super Slide's coaxial antenna connector.

All contacts are completely protected against damage, corrosion and shorting. Since connector bodies are molded in one piece with the slide—not riveted on—alignment is perfect and permanent.

Pins and sockets are arranged so no power reaches the radio until all other contacts are fully engaged, thus eliminating the problem of final stage burnouts.

The Super Slide mounts directly to most CB radios. No adapter brackets are needed. There is a phone plug to the extension speaker jack and a PL 259 connector to the antenna output. Power and ground connect to screw terminals—no splicing or crimp connectors.

Battery and ground leads as well as extension speaker (if used) are connected to screw terminals in an enclosed junction box. The antenna lead plugs into a matching coax connector.

Bevel slides, like those used in fine machinery, guide themselves into alignment for easier insertion—no fumbling or groping to find the grooves. The positive latch has a unique release that slides forward in the direction of removal, making it effortless to take out the CB radio or car stereo.

A patent covering unique features has been applied for.

Suggested retail price for CB version: \$16.95.

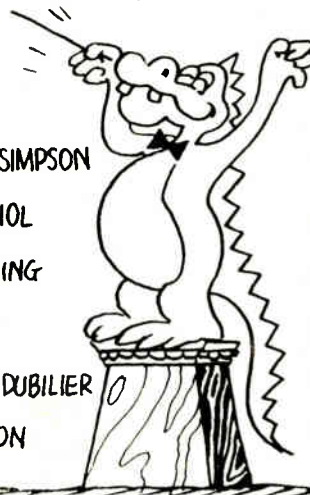
For further information contact: Gamber-Johnson, Inc., 801 Francis St., Stevens Point, WI 54481. Phone (715) 344-3482, or mark number G16 on Reader Service Card.

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- ★ TURNER
- ★ CORNELL-DUBILIER
- ★ AVANTI
- ★ JOHNSON
- ★ AND MANY MORE



## BEST IN SERVICE-

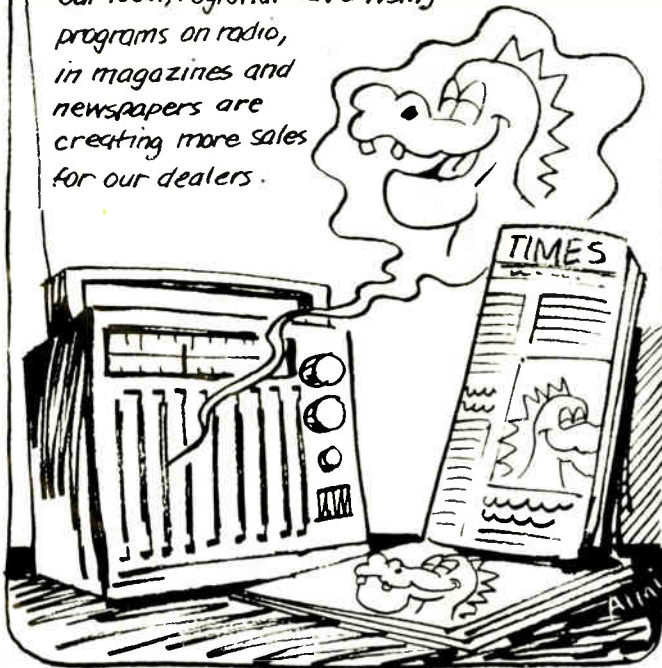
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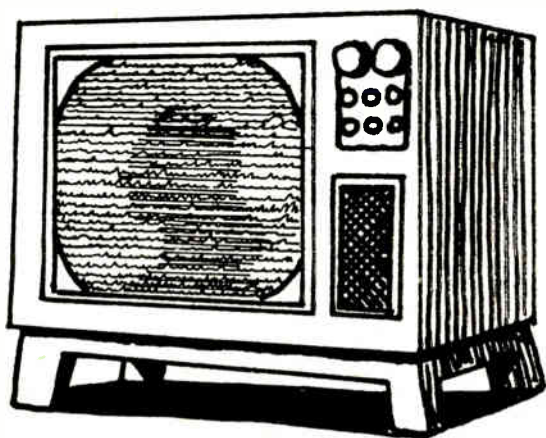
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**AMPHENOL** **BUNKER RAMO**®

# Add-on Remote Controls Cancel TVI



by Gordon V. West

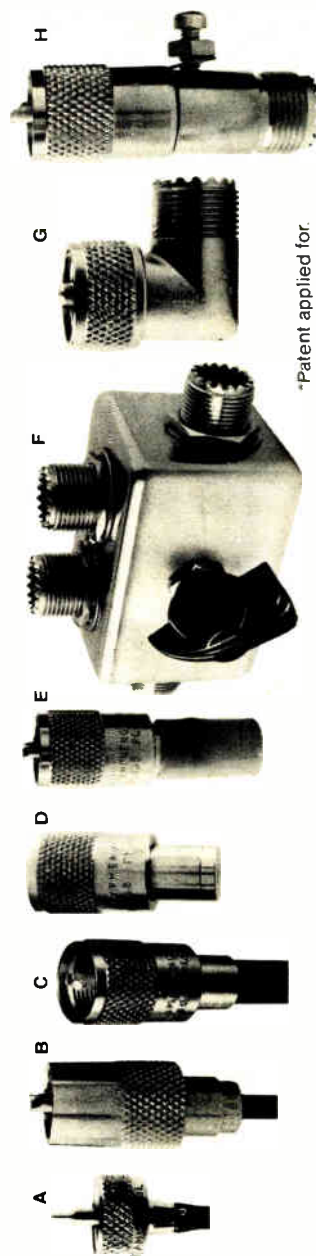
**T**ROUBLED by television interference? Whether it's caused by your own station, or the fella across the street on your own TV, TVI is simply no fun at all to try and cure. Once all efforts have been expended to "clean up" the offending CB transceiver, you now need to work on that television set. Sometimes it's easily cured with a high pass filter—sometimes not. Sometimes you can sneak away by simply adding some twin lead to your TV antenna circuit and pruning away the offending signal with a pair of wire cutters on the twin lead "stub." But sometimes you might think that you just have to live with it—at least, this is maybe what you tell your wife when you clobber up her Mary Hartman, Mary Hartman program when you are broadcasting on Channel 16 upper.

Thinking about adding a remote control to your television set? As you probably know, it's no longer a problem to add a channel changing remote to your TV tuner—no more need to spend hundreds of dollars in mechanical remote control devices, nor is there a need to take your TV set back to the service shop to have the remote installed. A new device is now available that acts electronically on your antenna input cir-

cuit to your television set—that's right, you don't even have to take the back off your TV set to add on full channel changing remote. And best of all, the television remote control will automatically filter out offending CB TVI signals. The remote control unit is actually a converter consisting of two separate parts—the first a remote control channel selector made out of high impact plastic with channel selection pushbuttons mounted on it, and the second portion is the RF converter. It's in this converter that all of the TVI filtering is accomplished.

All the controls you normally use are located on the channel selector which is attached by about 20 feet of small cord. This allows you ample length to roam around the room and remote control your TV set with this lightweight VHF and UHF channel controller. There is even an on-off button on most controllers, as well as a fine tuning adjustment.

The RF converter is mounted on any flat surface on the television with two No. 6 or No. 8 screws used with the key hole slots on top of the converter's bracket spaced approximately 5 inches apart. The converter electronics are then mounted to the TV set by these two screws, making sure not to block



- A. **Amphenol FCP\* connectors.** Install your antenna quick and easy. No special tools. No soldering. A knife and pliers do the job. No separate reducing adapter to buy, either.
- B. **Amphenol push-on plugs.** Fight theft of your mobile rig with these quick-disconnect replacements for standard plugs. No threading. So you can remove your rig and reconnect it—fast. Also great for test instruments with UHF connectors.
- C. **Amphenol 83-ISP connectors.** The standard PL-259 of the industry.
- D. **Amphenol dummy loads.** Terminate your rig in 52-ohm load for adjustment and repairs. Ideal for all CB and QRP ham rigs. Prevent unlawful transmissions when tuning or testing.
- E. **Amphenol power output indicators.** Show transmitter performance visually. The brighter the light, the greater the output. Check SSB carrier balance and modulation. For CB and ham HF QRP rigs.
- F. **Amphenol 2-way and 3-way antenna switches.** For maximum operating convenience and no lost contacts while fumbling with connectors. Metal case for maximum shielding, better impedance match.

\*Patent applied for.

There's more. Including Amphenol angle adapters (G), lightning arrestors (H), cable assemblies, attenuator filters, receptacles, etc. Ask your dealer for your free copy "The How To's of Interconnection."

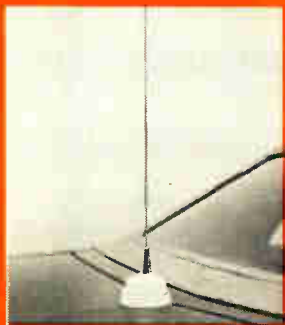
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Our Hellcat 4 Model 559 trunk-lip mount CB mobile installs easily with just two set screws. No holes to drill. No complicated instructions. No special tools.

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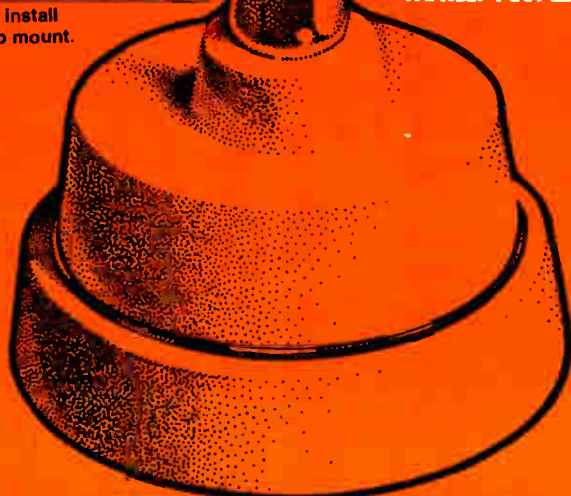
mum performance. So there's no tuning required. Ever.

All it takes is a few minutes and you have a professional looking, high performance antenna ready to roll with a strong stainless steel whip and special low-profile base.

The Hy-Gain 559 mobile. Just one of our many high performance CB antennas. See them all at your CB dealer. Or write our Department MM.

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**WE KEEP PEOPLE TALKING.**



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Hy-Gain de Puerto Rico, Inc. / Box 68 / Naguabo, PR 00718

the ventilation holes to the TV set. The TV plug is then unplugged from the wall and then plugged into the converter's AC outlet. The converter is then plugged into your wall socket, and your TV set may then remotely be turned on or off.

The television antenna cable that normally feeds directly to your TV set from the roof is now fed into the TV converter. If your antenna system is utilizing 75 ohm coaxial cable, you've got it made in a shade—in that it will simply plug right into the converter. However, there's probably not many of you that have this type of antenna cable—I didn't myself. If you don't, you are going to need two transformers that transform your 75 ohm coaxial cable input to 300 ohm twin lead. These are easily purchased at most CB stores—and remember, buy two. A length of coaxial cable connects the remote control to the TV input antenna terminals, and since we are using coaxial cable, it

will be necessary to affix another transformer to your TV input screws. In other words, you'll have twin lead coming down from the antenna, into the transformer which will then convert it to 75 ohms into the converter. The converter then generates a new signal and through coaxial cable feeds this new signal up to the antenna post of your TV set where it goes into another transformer you purchase to convert it back to 300 ohms. Possibly some of the new converters today will use exclusively 300 ohm twin lead inputs, but I doubt, in that most converters utilize coaxial cable connections to minimize losses. And if you have never soldered a coaxial cable connector designated F-659, you're in for a surprise—it ain't no fun! In fact, you might want to let the local serviceman do that in that it's quite tricky—a lot more tricky than soldering a PL-259 coaxial cable that goes on your CB antenna lead in.

Once the converter is hooked up properly, turn the whole works on by the remote controller, and then flick through the channels effortlessly and see how clear your reception is. In fact, most converters yield at least 4.5 db gain of TV signal reception, as well as appreciable db attenuation of unwanted interfering signals, such as CB signals. You may have found your CB transceiver's audio coming through loud and clear on Channel 2 and 4, but once a converter is used on those channels, there will be no trace of TVI. Electronically only the actual TV signal is allowed to feed through the converter and get to your TV set. A converter is a handy way for remote controlling your TV, improving your picture quality as well as the gain of the antenna, and most important eliminating TVI.



# S9 LAB REPORTS

The equipments shown here were put through their paces by Larry Friedman. Included along the battery of test gear employed is a B&K #2040 Signal Generator, Bird wattmeters, Tektronix RF spectrum analyzer, several regulated power supplies, and DB meters. Equipments selected for testing and review

have unusual features, features which might be of high interest to a specific CB communications need, or overall performance of unusually high quality. Manufacturers wishing to submit transceivers and other equipment for testing and review in this column should contact the Editor.

## • REALISTIC TRC-52

**Description:** A 40 channel AM transceiver for mobile, and P.A. operation. Requires a power source of 12 to 13.8 VDC with negative or positive ground. Overall dimensions are 5<sup>7</sup>/<sub>8</sub>-in. wide x 2<sup>1</sup>/<sub>4</sub>-in. high x 9<sup>1</sup>/<sub>2</sub>-in. deep.

Features include double conversion, a remote speaker jack, a P.A. speaker jack, RF gain, and an S/RF meter.

There are front panel controls and switches for: Channel selection, volume, squelch, RF gain, PA/CB, and ANL.

Standard equipment includes a microphone, mobile mounting bracket and a DC power cable.



### Receiver Test:

AM input sensitivity	0.6 $\mu$ V
Adjacent channel rejection	60 dB
AGC action	15 dB
Input level for S9 meter reading 100 $\mu$ V	

### Transmitter Test:

AM RF output into 50 ohms	3.6 watts
85% modulation sensitivity (0 dB is average)	+12 dB
Modulation limited to 100%	yes

**Editorial Comments:** This transceiver features s-meter calibration of 5 dB per s-unit.

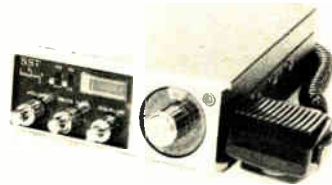
## • BROWNING SST

**Description:** A 40 channel AM transceiver for mobile, and P.A. operation. Requires a power source of 12 to 13.8 VDC with negative or positive ground. Overall dimension are 6<sup>3</sup>/<sub>8</sub>-in. wide x 2<sup>5</sup>/<sub>16</sub>-in. high x 10-in. deep.

Features include double conversion, a remote speaker jack, a P.A. speaker jack, delta tune, and an S/RF meter.

There are front panel controls and switches for: Channel selection, volume, squelch, PA/CB, and a noise blanker.

Standard equipment includes a microphone, mobile mounting bracket and a DC power cable.



### Receiver Test:

AM input sensitivity	0.3 $\mu$ V
Adjacent channel rejection	58 dB
AGC action	5 dB
Input level for S9 meter reading 100 $\mu$ V	
Fine Tuning	+2.4/-1 KHz

### Transmitter Test:

AM RF output into 50 ohms	3.8 watts
85% modulation sensitivity (0 dB is average)	-10 dB
Modulation limited to 100%	yes

**Editorial Comments:** The mobile mounting brackets are attached with special anti theft screws, which cannot be easily removed without the special tool supplied with the transceiver.

## • COURIER NIGHTRIDER 40DR

**Description:** A 40 channel AM transceiver for mobile, and P.A. operation. Requires a power source of 12 to 13.8 VDC with negative or positive ground. Overall dimensions are 6-in. wide x 2<sup>1</sup>/<sub>16</sub>-in. high x 10-in. deep.

Features include double conversion, a remote speaker jack, a P.A. speaker jack, S/RF meter, and a modulation light.

There are front panel controls and switches for: Channel selection, volume, squelch, RF gain, Tone, PA/CB, and a noise limiter/blanker.

Standard equipment includes a microphone, mobile mounting bracket and a DC power cable.



### Receiver Test:

AM input sensitivity	0.38 $\mu$ V
Adjacent channel rejection	67 dB
AGC action	4 dB
Input level for S9 meter reading 38 $\mu$ V	

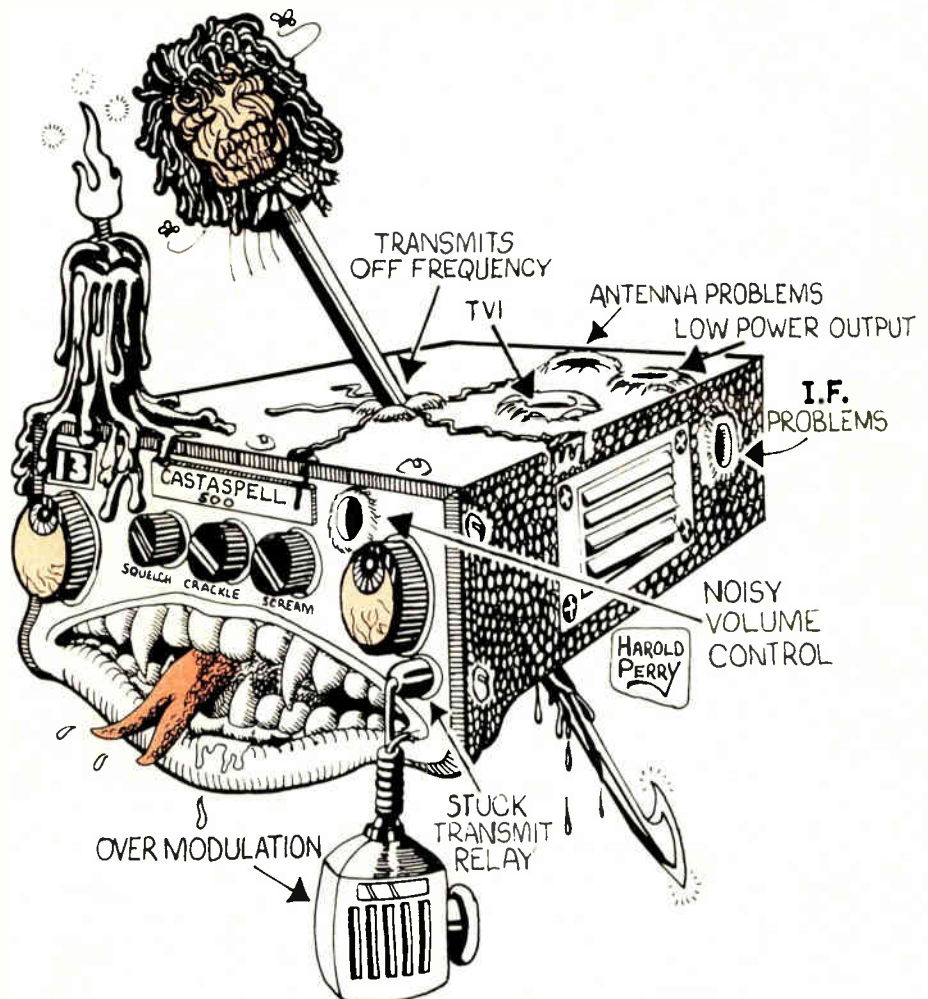
### Transmitter Test:

AM RF output into 50 ohms	3.8 watts
85% modulation sensitivity (0 dB is average)	0 dB
Modulation limited to 100%	yes

**Editorial Comments:** This transceiver features an L.E.D. digital channel indicator and channel indicator built into the microphone. It also features a modulation light.

# Tomcat's Sure-Fire Olde Tyme Hoodoo Cure

for  
annoying  
inter-  
ference  
from  
neighbor's  
CB sets



Here is the effigy of the offending CB rig, and MAMA MOJO's selected pin-insertion points for creating havoc to any CB rigs which cause problems to your own operation.

I am told that some CB'ers have tried this time tested old trick, supposedly it has been passed down through countless generations of CB'ers. I got it at great personal risk while I was vacationing in the alligator-infested bayous of the St. Lawrence Seaway. Old MAMA MOJO came creaking out of her hut, winked, and handed me these instructions on how to get those pesky neighbors off the band—you know, the guy next door who wipes out 15 channels of your rig every time he presses his mike button!

Here's what MAMA MOJO says to do—*Hoodoo* the guy off the air. You take a cardboard box and carefully make a duplicate of whatever kind of set he has, you might even find a picture of his set in an ad, just snip it out and paste it to the end of the box. Then get yourself several long hatpins, the kind with the big knob at the end. According to MAMA MOJO, these pins can then be stuck through various parts of the

cardboard rig to produce a variety of mishaps in the other guy's CB rig—overmodulation, low power output, etc.

I don't know if there is anything to this, but MAMA MOJO gave me the secret pin-insertion point locations to produce the desired results, and I'm passing this along to you for experimentation as needed. It might add to the whole operation if you danced a bit and chanted something fierce as you stick the pins in, and you can use several pins at a time in different locations.

One further thought on this comes from ACUPUNCTURE AL, another CB'er. AL says that if your own rig breaks, you can do the same thing with golden pins and maybe it will cure the set!

Will any of this work? Who knows—however when I met MAMA MOJO last December she was sticking hatpins in a weather map!

---

# TOMCATTIN' with "Tomcat!"

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



**D**ON'T look now but we're having a birthday! True, our calendar tells us that this issue marks the start of our 16th year of publication here at CB RADIO/S9—and what a time it has been! Many of our original subscribers are still active in CB radio, and continue as subscribers! Many of the original staff members have remained with us too! If the past 15 years is any indication as to the course CB radio will run in the next 15 years—WOW! . . . One of the things which *won't* be happening is the establishment of any designated channels with the exception of Channel 9 for emergencies. Uncle Charlie received a ton of requests for *this* or *that* channel to be designated for one purpose or another—truckers, 4-wheelers, Sidebanders, farmers, and what-have-you. They carefully considered all of these requests then threw their hands in the air and walked away from the whole thing shaking their heads in confusion, saying that they "couldn't provide protection against interference to CB'ers who select particular channels for their use." Now that's what I call an agency which is serving the public interest, convenience, and necessity! They did, in passing, take notice of the fact that "many motorists and truckers use channel 19." Hey, who says that Uncle Charlie doesn't know what's happening in CB? He knew about Channel 19—so that's a start! . . . TOM-CAT JR. called (collect) from the San Diego Navy Base to tell me that a goodbuddy of his caused so much TVI that when Uncle Charlie renewed his CB license it had the letters "TV" after the numbers! . . . ARMENIAN AL swears he knows of a CB Jamboree that had to be cancelled because they couldn't get a break on any channel to tell anybody when and where it was to be held! . . . I had a reader come by the office to explain a great new idea he had—it was called *Cable CB*, similar to *Cable TV*. His scheme was to have cable

connections to all homes in a community, so when someone decides to become a CB'er he or she can pay a small monthly fee and hook the CB rig right to the cable and be interconnected to all other local operators. He said that this system would eliminate any skip interference, would end all of the congestion on the airwaves, end the need for putting up base station antennas, etc., etc. You wouldn't believe the paperwork he had put together on this idea, complete with charts, diagrams, hardware samples, cable layout systems for a proposed test run of the system. He was trying to get financial backing and wanted me to give his idea a write-up in CB RADIO/S9. Well after listening to a 30 minute outline of all of this, someone finally had an interesting observation—Lori, CB RADIO/S9's Managing Editor, casually asked the inventor of *Cable CB* how you were supposed to contact your mobile unit with this system. *Gosh—gulp*—poor guy never even thought of that! I shook his hand, looked him squarely in the eye, and had the very sad duty to inform him that he had just re-invented the telephone! . . . Got a note from Don, LUCKY 13 (also SSB-4315) who tells me that he is trying to organize an emergency communications club in his neck of the woods (Ecorse, Mich.) which will encompass both AM and SSB, hams and CB, CAP, Power Squadrons, and other groups. First Aid courses for all members will be available, and, all in all, it looks like Don has a good idea. If you live in the area of Ecorse, why not check this out. Contact Don Genyn, 4368 6th St., Ecorse, Mich. 48229. . . . Several local communities and states are putting together legislation which could cause CB'ers (and other 2-way radio users) to pay fines or "damages" for causing TVI, AM, or FM interference. . . . The FCC is tossing around an idea which would (hopefully) improve the problems of many radio users (espe-

cially CB'ers) not using their callsigns on the air. The new concept is to let operators install a device in their rigs which would send out an automatic identification every once in a while via CW (code). Filters would also be available so that operators could strain out any incoming morse code identifications sent out by other stations—since it's only the FCC that's really interested in hearing these and because you'd get a little batty trying to have a conversation on a channel filled with the continuous chatter of dozens of *dits* and *dahs* going on in the background. Putting one of these on a CB transmitter would be optional, primarily a convenience for those operators who feel guilty about not using their FCC callsigns in line with FCC regulations. But it is only a prelude to the mandatory *Automatic Transmitter Identification System* (ATIS) which the FCC suggested for CB as long ago as about 1966! . . . Want to do something useful for yourself? Take an idea used effectively by Willie, SSB-5744-A. Willie inhaled 2+ packs of cigarettes a day for many years and just couldn't get up the steam to quit—despite the demands of his sawbones. Willie's XYL came up with the answer—he stopped smoking by taking the amount he would have spent daily on coffin nails and tossing it into an empty milk bottle. In about a year or so he had saved up enough to start shopping around for the super deluxe sideband base station he had always wanted—and his quarters and dollars just arrived at the neck of the milk bottle about the time the new 40-channel version of his dream rig went on sale! . . . Whatever became of CB songs? . . . *Courtesy Dept.:* Max, UNIT 856-H, had his new 40-channel mobile rig ripped off while his wheels were parked at a baseball stadium. But the *Citizens Bandit* had pity on Maxie—in place of the 40-channel rig he had just stolen, the crook left his own beat-up old 23-channel rig on the seat of Maxie's car in exchange! Ironically, Maxie's stolen rig was the new 40-channel version of the 23-channel rig the crook left him! Now that's what I call a nice guy! . . . I think that there must be a new CB rig on the market featuring a TV screen which lets the operator get an eyeball on stations who call him. Notice how many other guys ask "Who'm I looking at?" when someone calls them! . . . Gary U.S. Bonds (BABY CAKES on AM, and SSB-17 on the sidebands) tells me that he was appearing at a west coast *Playboy Club* recently and one of the *Bunnies* told him she was a CB'er (Handle: COT-TONTAIL)—she had invented a new CB-lingo term. According to her, an antenna tower is a *Beam-*

*stalk!* . . . There were a lot of red faces down at Uncle Charlie's when the licensing computer cranked out the "wrong" callsigns to a whole bunch of ham stations—oops! *Sorry about that!* . . . THE SLEEPWALKER, John, out of St. Augustine, Fla., swears that he heard someone ask for a radio check when some other station came back with a flowery worded question: "What might be your 20?" The answer he received in return was: "It *might* be Europe—but don't bet on it!!!" . . . A little birdie tells me that Uncle Charlie is very seriously considering phasing out (dumping) the Novice Class ham license—they seem to think it has turned into a Frankenstein—got so popular and had so many licensees that now they say they can't afford to process the applications! Unfortunately, it has been the FCC's crowing about how CB'ers should get a Novice ticket which helped to bring in all of those new Novices! Maybe they might think about opening up a few CB channels for skip working if they can no longer offer CB'ers an easy step into the pleasures of ham radio! . . . Book review topics: Two really useful books have drifted onto the top of the debris on my desk this month. The first book is called *The Underground Buying Guide*, published by PMS Publishing Co. This is 184 pages of fascinating source material for CB'ers, hams, and all electronics hobbyists. It gives manufacturers' names and addresses of just about every type of hobby electronics hardware you could think of from AC Line Filters to Wireless Microphones—you'll use it on a regular basis! The next handy book is Len Buckwalter's *North American CB Channel Directory*, an amazing compilation of nationwide CB channels used for service stations, restaurants, Smokeys, rescue squads, truckers, campgrounds, soul stations, and lots more. If it's on CB, then Len's book probably includes it. The book is published by Target Books—it's a winner if you figure to put your wheels on the superslabs this summer! . . . I also enjoyed reading *Emergency! 10-33 On Channel 11!*, a CB novel by Hilary Hilton, KHM8703/RAILBENDER. Hilary's book concerns an account of how youngsters swing into CB action during a flood threat—and it's full of searches and other fast-paced action. It's a book which you will find your youngsters eagerly fighting you for—it has a universal appeal to any CB enthusiast, regardless of age! It's a hardcover book published by Franklin Watts—look for it! . . . In our April issue of CB RADIO/S9 we ran a story on illegal "HF" operation. We asked for reader comments—I would say that we've had some rather spectacular ones, too. Some of our

readers from within the ham radio community were especially vocal - several not only denounced HF operations, but also me personally for having the gall to run a story in which HF was even mentioned! Curiously, the April issue of 73 Magazine, a ham monthly, devoted quite a bit of space to denouncing HF. However, in the very same issue of 73, there was a story extolling the popularity of HF CB operation, complete with rather explicit instructions on how 73's ham readers could modify their equipment to operate on HF frequencies - just to (heh! heh!) listen, of course! I'm assembling some of the wild and incisive reader comments on the topic of HF received in response to our April issue. I'll run it in a forthcoming issue of S9 - the responses will surprise you!

*Tomcat!*

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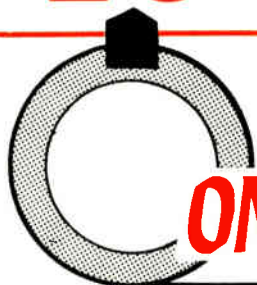
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S9's Monthly Column for Sidebanders

**ON THE SIDE.....**

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.

#### MIDLAND INTRODUCES 40-CHANNEL SSB/AM MOBILE

Midland introduced a new 40-channel SSB/AM mobile transceiver. The Model 79-893 with Phase Lock Loop synthesizer has fully compatible operation on all 40 AM channels as well as upper and lower sidebands for a total of 120 effective operating modes.

The transmitter is rated for legal maximum 4.0 watt output power on AM and delivers 12.0 watt P.E.P. on single sideband with high level modulation.

Superhet ears have dual detectors for AM and single sideband, RF gain, switchable noise blanker, full-range variable squelch, hi/lo audio tone control and clarifier control.

The new Model 79-893 also features a lighted signal/power meter, lighted channel indicator and P.A. switch.

The unit operates on 12-volt DC, positive or negative ground, through Midland's Omni-Power system.

With plug-in push-to-talk microphone, plug-in DC power cord, mobile mounting bracket and hardware, the Model 79-893 has a suggested retail price of \$369.95.



#### A MATTER OF COURTESY

So much has been said and written about the fact that Sidebanders are courteous on the air that it might be well to pause for a few moments and think about what *being courteous* really means—if anything at all!

Are we speaking about courtesy in comparison to the type of operations on most AM channels—if so, by comparison, even an eyedropper full of courtesy on Sideband would be out of sight. Or, are we talking about our own "sideband" brand of courtesy, something which really should exist to its fullest, should be more than a millimeter better than AM operation!

So, we are obviously speaking about not stepping on another Sidebander who is calling a station or who is engaged in a QSO. On the other hand, it's a two headed axe—we are also talking about not hogging a frequency to the point where there are bound to be others forced to stacking up in wait for the frequency. If the hogged frequency happens to be one used in your area as a calling frequency (such as 16-L is in many areas), then it is inexcusable rudeness to fellow operators.

Courtesy is not getting embroiled in a fight-to-the-finish over some real or imagined affront from another operator. OK—if you've got a gripe, use the landline or wait until the next club meeting to settle it, or meet the other operator at a diner or pub to come to a meeting of the minds—or to try to. But to air your personality problems over the air—to tie up a frequency as you berate some other operator for whatever your problem is, has to be pretty incon-

siderate to others who may wish to use the frequency. And, while you may think your tirade is being done on behalf of countless other area operators—mostly your words will come over the air as boring, dull, petty, and generally stupid. Best bet if someone tries to pick a fight with you over the air is to refuse to reply to them—or to tell the guy you'll discuss it with him in private. Exhibitionists don't belong on sideband! Other operators on the frequency who are not involved in the "situation" are not interested in being your jury.

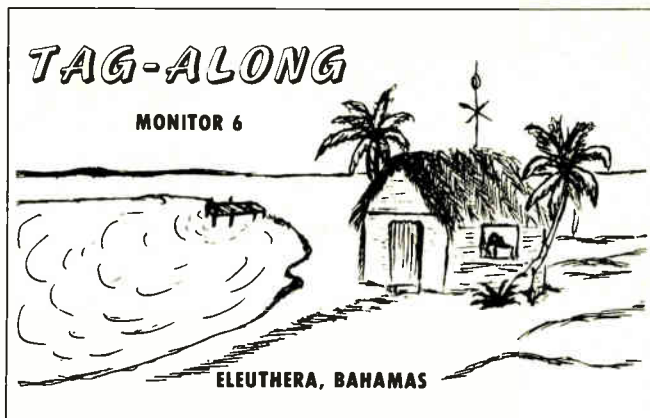
Courtesy is *not* jumping down the throat of a sincere but inexperienced new Sidebender who makes a remark like, "What's your QRT?", or "Let's QTH to some other frequency." A little patience goes a long way—and your kindness in explaining the beginner's goof, and without trying to embarrass the new operator, will gain you a lot more respect from your fellow Sidebanders than if you go into a hysterical tirade of sarcastic and nasty orations to try to impress everyone on the frequency of how *smart* you are.

Evan Herbert, SSB-29, author of *THE BEST BOOK ON CB* (which you should have in your library if you don't—and a new revised 1977 edition is now available) mentions in a letter that in his area of New Jersey there are some Sidebanders belonging to a club who—unfortunately, says Evan, they tend to take over a frequency as if they own it and those who don't belong to the group sometimes have difficulty using the frequency. My feeling is that this is a lack of courtesy, and for any club to tolerate this sort of thing makes you sort of wonder how interested they *really* are in getting sideband to move forward—or if they are simply a bunch of operators who don't care about their fellow Sidebanders! I suspect that this complaint is one which could be made in a number of areas of the nation!

Hate to be corny—but the golden rule really does apply in Sidebanding!

### EXCLUSIVE SSB CHANNELS—R.I.P?

If, like most of us, you were anxiously awaiting the FCC to establish exclusive SSB frequencies, forget it—they have decided against the idea. This also includes the possibility of a concept which they were considering which would have established sideband frequencies 5-down from regular CB channels; that notion has also been harpooned. The FCC did admit to receiving "numerous inquiries" on setting up sideband frequencies, but they copped out on it because (they said) that when it turned out that the expanded CB service would total only 40 channels because of technical limitations which prohibited more frequencies, they felt that they should make all of the 40 channels "on a shared basis to AM and SSB users alike."



Here's a card from the Bahama Islands, it's from Joe, SSB-6200/NPO-556. Joe's in the Navy and stationed in this exotic QTH! Channel 6 is the local AM operations channel—TAG-ALONG is how he's known on the AM side.

If you think that the FCC doesn't realize that AM and sideband cannot coexist on the same local frequencies, you're wrong. They realize it full well—but they are having too difficult a time trying to get CB operators to obey the present regulations without making any additional restrictions. That's the *real* reason. *Phooey!*

I really think that the FCC's handling of this whole situation is beyond belief—I, for one, feel that we, as Sidebanders, are the innocent victims of their inability to take action in this matter. Surely common sense must mandate a separation of sideband and AM frequencies. Just because the FCC is trying to get out from under its responsibilities on this, I don't think that we should let them off the hook—when they've got something *they* want, they certainly know where, when, and how to climb all over us!

Let's not let them walk away from this one—let's keep pushing for separate exclusive sideband frequencies—and if the FCC isn't capable of policing and maintaining them at least as well as they are putting the screws on HF—*let's find out why!*

Ever since Sidebanders appeared on the scene back in 1964 we have tried to implement sane and responsible communications practices. Groups like the national *SSB Network*, plus many local and regional groups, and thousands of individual operators have fought and clawed for some slim shred of FCC recognition of Sidebanders as a separate branch of the 11 Meter fraternity—for a few channels to be set aside for Sidebanding use.

It seems all the more curious as to why the FCC is therefore so doggedly determined to "protect" the handful of remaining industrial and business licensees on the so-called "HF frequencies," while they are so totally disinterested in establishing a workable system for millions of Sidebanders to communicate on authorized frequencies. Hey, Mr. FCC, let's have some answers! *Or don't you have to answer to the public anymore?* Let's have some answers!

Let's not let this go by the boards, let's let the FCC know that we want certain frequencies set aside

from within the existing 40-channel band for exclusive use of Sidebanders! Let's not settle for less!

Fact is, we can't settle for less—because the AM'ers aren't going to be any happier about it than we are when the two totally different transmission modes and operating techniques butt up against each other in any given area. If you think that REACT is going to be happy about Sideband emergency communications being set up by local Sidebanders groups on Channel 9 you're in for a surprise—they will yell long and loud about it—but the FCC will tell them that Sidebanders are *supposed* to use Channel 9 for emergencies!

The FCC has been known to change its mind—however only when they have been shown overwhelming evidence that they have embraced a monumentally unpopular philosophy. Our suggestion is to let them know, in Q-5 terms, that Sidebanders aren't to be quietly shoved to the back of the shelf and buried into the AM noise level. That we want very much to operate within a realistic set of rules and regulations, that we must have frequency space made exclusively for single-sideband transmission.

The SSB Network, whose national efforts on behalf of the Sidebanding fraternity date back to 1964, has prepared a strongly worded petition which we feel gives the FCC a rather clear, straightforward, and uncomplicated view of the feelings of Sidebanders.

Each petition has room for *lots* of signatures—just the thing for passing around at club meetings, coffee breaks, jamborees, or for putting on the counter at shops selling sideband gear. They'll be happy to send a packet of 10 of these petitions (at no cost) to any individual, club, or sideband shop. This will be required for getting the massive unified national support which any gripe we have would need if there is any hope at all for making headway with the FCC. To receive a set of these strongly worded petitions, write to Petition, c/o The SSB Network, P.O. Box 381-JJ, Smithtown, N.Y. 11787. Be *sure* to include with your request a large stamped and self addressed brown envelope—I would say to put at least 35¢ return postage on the brown envelope—for them to send the petitions to you.

Now's the time to start demanding action—the next guy isn't going to do it, it's up to *you*. How much is Sidebanding worth to you?



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# COMING EVENTS!

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

## JULY

**Bailey, Colorado.** Annual convention of National CB'ers Association, Inc. July 1st-3rd, at the Farmers Union Bldg. For details write to Association at Rt. 1, Box 108, Pine CO 80470, Diana M. Kloppel, secretary.

**Shallotte, North Carolina.** 1st Independence Jamboree of the Land and Sea Search and Rescue C.B. Club. July 2 & 3. At the National Guard Armory Bldg., Hwy. 17 South; halfway between Myrtle Beach, S.C. and Wilmington, N.C. For info, P.O. Box 843, Shallotte, NC 28459. Telephone (919) 754-6564.

**Beatrice, Nebraska.** NEB Sidebanders Club 1st Annual Jamboree, July 2-4 at Gage County Fairgrounds. For more information contact: NEB Club, Box 81, Holmesville, NE 68357.

**Las Cruces, New Mexico.** Southern New Mexico CB Jamboree of Las Cruces Radio Team Inc. July 2-4th at the Southern New Mexico Fairgrounds, 12 miles west of Las Cruces on Interstate 10. For more info write team at PO Box 1631, Las Cruces, NM 88001. Phone (505) 523-9202.

**Menoken Grove, N. Dakota.** 4th Annual Jamboree of the Central North Dakota CB'ers. July 8-10th. Exit 38 on I-94, just east of Bismark. For more info write Gary, 602 N. 24th, Bismark, ND 58501.

**Eureka, Calif.** Jamboree of Redwood Empire Bigfoot. July 8-10th, at Redwood Acres Fairgrounds, Rt. 1. For more info write club at Box 278, Sp. 62, Eureka, Calif. 95501.

**Whitney Point, New York.** Electronic Show and CB Jamboree, July 8-10th, Whitney Point Fairgrounds. Rt. 11, Exit 81. For more information: International Order of Chiefs and Squaws QSL Club, P.O. Box 25, Binghamton, New York 13903. (607) 722-3536 or 772-8860.

**Whitney Point, New York.** Jamboree of International Order of Chiefs & Squaws QSL Club. July 8-10th at Whitney Point

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*S & A*

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Fair Grounds, North of Binghamton, South of Syracuse. Rt. 11—Use Exit 8 off Rt. I-81. For more info write Club at P.O. Box 25, Binghamton, N.Y. 13903. (607) 722-3536 or (607) 797-9051.

**Rock Springs, Wyoming.** Rowdy Bunch Jamboree, July 9-10th at New Fair Grounds. Sponsored by Rowdy Bunch Inc. Proceeds go to handicapped children. For more information write Rowland Fisher, Box 102, Rock Springs, WY 82901.

**Olean, New York.** 2nd Southwestern Jamboree. July 10th at Royal Ed-Nor, Smith Hollow. For more info contact David Grimes, 3742 Birch Run Rd., Allegany, NY 14706.

**Madison, Wisconsin** Break of the Southern Wisconsin CB Club. July 10th at Warner Park, located at Highway 113 and North Sherman Ave. For more details contact SWCBC, Box 153, Verona, WI 53593 or phone (608) 845-6039.

**Grand Island, New York.** Jamboree of Bison City. July 15th-17th at Island Lanes, 1887 Whitehaven Road, Exit N19 off I-190. Featuring "Live Nashville Entertainment." For more info write Am-Can Radio Club, P.O. Box 147, Hiler Station, Buffalo, NY 14223. (716) 883-8060.

**Butte, Montana.** Treasure State CB Jamboree. July 15-17th at Rodeo Grounds. Sponsored by Bagdad Shrine —proceeds to Shrine Hospital. For more info: write P. O. Box 3083, Butte, MT 59701.

**Jacksonville Beach, Florida.** July 16 & 17th, Jacksonville Beach Coliseum. 4th Annual Voice of the Beaches Jamboree. For information: Bill Jackson, P.O. Box 50906, Jacksonville Beach, FL 32250 or 904-285-2937.

**Bristol, Indiana.** Jamboree, July 16-17, Eby's Pines, Rt. 2 Junction, U.S. 131 & Interstate 80-90. Contact Chairman, R. M. Shipman, P.O. Box 7092, Toledo, OH 43615.

**Watertown, South Dakota.** Annual Jamboree of the Crystal Busters Radio Club. July 16 & 17th at City Park, Lake Kampeska. For more info write Mrs. Glenn Forman, Secretary, 1335 4th Ave., S.E., Watertown, SD 57201.

**Douglas, Wyoming.** Jamboree of Jackalope CB Club. July 22-24th at the 4-H Bldg., State Fair Grounds. For more info write the club at P.O. Box 789, Douglas, WY 82633. Or call Mama Blue at (307) 358-2289 or 2320.

**Milwaukee, Wisconsin.** 1st International Break of Beer City Smoke Blowers. July 22-24th at the Red Carpet Inn, 4747 S. Howell Ave., across from Mitchell Field Airport. For more info, 445-9039 or contact the Inn at 481-8000.

**Shortsville, New York.** Superbreak & Jamboree of the Alert React CB Club. Sunday, July 24th at the Turner-Schrader American Legion Post on Rt. 21 North. For more info contact the club at P.O. Box 613, Shortsville, NY 14548.

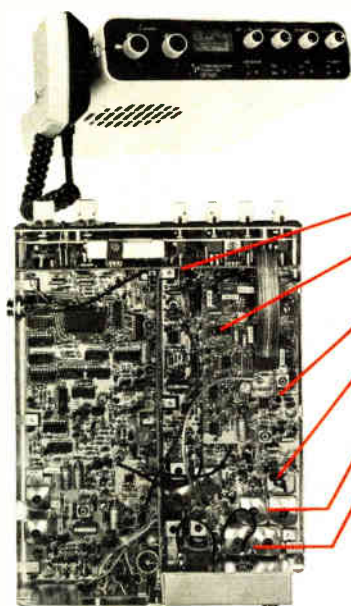
**Callicoon, New York.** Coffee Break of Penn-York CB Club. July 24th at Hermann Hall, Delaware Youth Center. For more info contact Woody Schlegel, R.D. #1, Cohecton, NY 12726. (914) 932-8487.

**Eugene, Oregon.** Twin Rivers Channel Breakers Jamboree. July 29-31st at Lane County Fairgrounds. For more info write club at P.O. Box 1162, Eugene, OR 97401.

**Paragould, Arkansas.** Sixth Annual Jamboree of Paragould Area CB Club. July 30 & 31st, at Reynolds Park, approx. 2 miles west off Hwy. 1 Bypass on Country Club Rd. For info: Claude Gore, Jr. 605 West Court St., Paragould, AR 72450. 239-8325.

**Albuquerque, New Mexico.** 5th Annual Cactus Patch CB Jamboree. July 30-31st at Western Skies Motel, Exit 167, I-40. For more info write chairman at P.O. Box 11113, Albuquerque, NM 87112. (505) 294-5159.

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## AUGUST

**Bakersfield, Calif.** 1st Annual Jamboree of the Golden Empire Sideband Assoc. August 5-7th. At Kern Co. Fairgrounds, Union Ave. (Old Highway 99) and Ming Ave. For more info write: G.E.S.A. Inc., P.O. Box 967, Bakersfield, CA 93302 or call 805-399-1321.

**Jacksonville, Florida.** 1st Annual Jamboree of American Eagle CB Club. August 6-7th at Phillips Mall, Phillips Highway. For more info write club at P.O. Box 7205, Jacksonville, FL 32210 or call John Hollingsworth, 904-737-9527 after 5 pm.

**Alexandria, La.** 12th Annual CB Jamboree of Mid-State CB Radio Club, Inc., August 6 & 7th at the Rapides Parish Coliseum. For information write: Mid State CB Club, P.O. Box 1945, Alexandria, LA.

**Logan, W. Virginia.** Jamboree of Logan County Citizens Band Radio Club. August 6 & 7th, at Logan Memorial Fieldhouse. For more info write Chairman at P.O. Box 364, Logan, W. Va. 25601.

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**Raleigh, North Carolina.** 7th Annual Old North State Jamboree of Raleigh United CB Club. August 6th & 7th at North Carolina Fair Grounds. For more information please contact Boyce W. Cox, P.O. Box 11167, Raleigh, NC 27604.

**Mt. Carmel, Illinois.** 2nd National Jamboree of the Wabash Valley Co Ax Cutters CB Club, Inc. August 7th at the 4-H Center. For more info write I. Meier, 1117 Walnut Street, Mt. Carmel, IL 62863 or call (618) 262-4338 or 262-5435.

**Kingsport, Tennessee** Tri-City Communications Club Jamboree. August 12-14th at the Tri-City Comm. Club Bldg. (formerly Rod & Gun Club) located on Beason Wells Rd. For more info write Bobby Degarn, P.O. Box 774, Church Hill, TN 37642 or P.O. Box 245, Kingsport, TN 37662.

**Mexico, Missouri** 8th Annual Coffee Break of Little Dixie CB Club. August 13th-14th at Todd's, Highway 54 South. For more info contact James Hancock, 11 Venus, Mexico, MO, 581-5107, or Ray Kemp, 408 Eastholm, Mexico, MO, 581-0669.

**Amboy, Illinois.** Old Communications CB Radio Club Jamboree. August 13 & 14th at Lee County 4-H Fairgrounds on US 30. For more info write Curtis Bryant, 1228 Garfield Dr., Rochelle, Il. 61068, or phone (815) 562-7096 or (815) 562-6960.

**Alexander, New York.** 3rd Annual Coffee Break of the Friendly Group CB Club. August 14th at the Alexander Firemens Park, Rt. 98, 1/2 mile south U.S. 20. Proceeds go to Burn Treatment Center of Western New York. Contact Ann Cory, Secretary at 5849 Broadway, Lancaster, NY 14086.

**Coranite Dells, Arizona.** 4th Annual Prescott Jamboree. August 19-21st, 4 miles north of Prescott on Highway 89. For more information contact chairman at P.O. Box 1802, Prescott, AZ 86301.

**North Springfield, Vermont.** 10-4 CB Clubs 1st Annual Coffee Break. August 21st at the Hartness Airport, Rt. 106. For more info write club at Box 44, Springfield, VT 05156.

**Morgantown, West Virginia.** 5th Annual Jamboree of Mon-Valley React Club 2209. August 26-28th at Chestnut Ridge Camp Grounds. Coopers Rock exit off U.S. Route 48 to Rt. 73 & follow jamboree signs. For more info contact Eugene Fullmer-President, P.O. Box 1005, Morgantown, W. Va. 26505.

**Baton Rouge, Louisiana** 7th Annual Jamboree and Dence. August 27 & 28th at L.S.U. Assembly Center. Sponsored by the L.A. Capital City Area C.B. Ass'n. P.O. Box 15464, Baton Rouge, LA 70895. Phone (504) 261-3179.

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**Columbus, Georgia.** 6th Annual Jamboree of Chattahoochee Chatters CB Radio Club. September 3 & 4th, at Clubhouse on 45th Street and River Road. For more info write club at P.O. Box 6221, Columbus, GA 31907.

**Webster, Massachusetts** 12th Annual Jamboree of Southern New England Citizens Radio Assn., Sept. 11th at Point Breeze, just off Rt. 193. For more info contact Bess Stevens, A. F. Putnam Rd., Charlton, MA 01507. (617) 248-5288.

**West Deering, New Hampshire.** 3rd Annual Coffee Break, September 18th at Deering Fish & Game Grounds. Monitor Channel 14, KAFX-9379. For more information contact Sunshine CB Club, R.F.D. #2, Hillsboro, N.H. 03244.

**Lake Havasu City, Arizona.** Jamboree Sept. 23-25th at Crazy Horse Campgrounds. For more info write Jamboree Secretary, Box 582, Lake Havasu City, AZ 86403. Bucket Seat, Secretary.

**OCTOBER**

**El Dorado, Kansas** 2nd Annual Jamboree of Midway Emergency Radio Team Inc. October 1st & 2nd at Butler County 4-H Building. For more info contact Larry Bell, Chairman. Box 1279, El Dorado, KS 67042. (316) 321-1543 (evenings).



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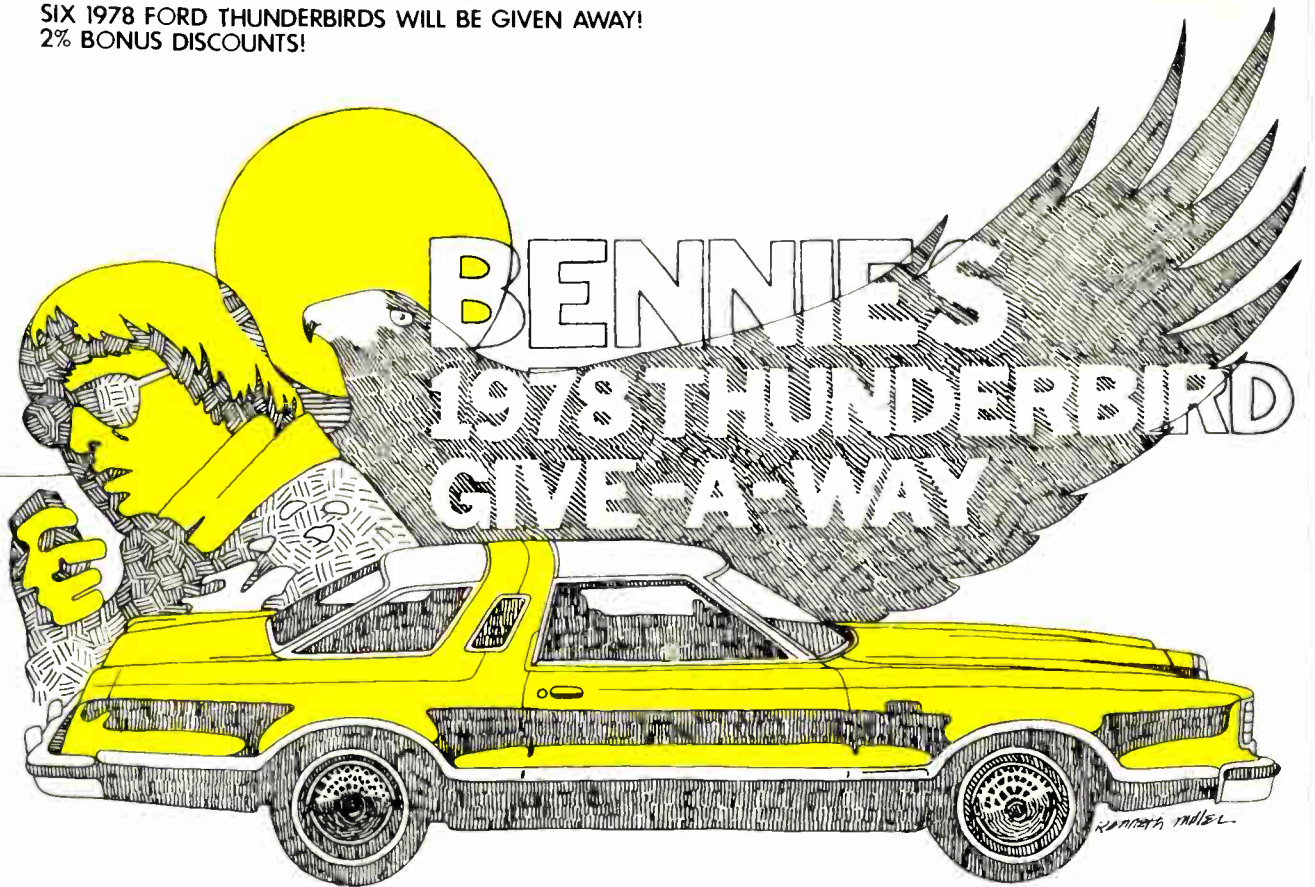
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# Buying CB Coaxial Cable

**S**ELECTING an antenna cable for your CB radio can be simple, if you follow a few guidelines. Well-known antenna manufacturers generally supply quality cable in their antenna kits. However, you may have problems buying coax for replacement or a special setup. It's virtually impossible to tell good cable from bad unless you're an expert. Although the best coax can't make your radio perform any better, bad cable

can cause signal degradation and reduced output.

Tom Siekierka, a coaxial cable design engineer at Belden Corporation's Technical Research Center, Geneva, Ill., has some advice for coax buyers. "Rely on the expertise of the wire specialist at your electronic distributor or CB specialist. These people are qualified to assist you in selecting the proper cable, and will save time and money in the long run." (cont'd)

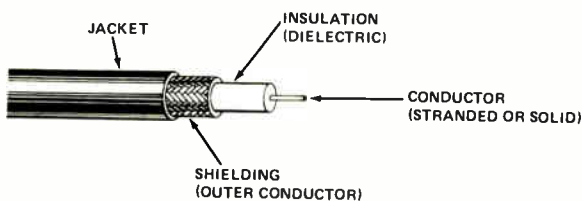


Fig. 1—What's inside coaxial cable.

CABLE	RECOMMENDED USE	DIA. (IN.)	IMPEDANCE (OHMS)	CONDUCTOR TYPE
RG-58	mobile units	0.2	50	stranded
RG-8	base stations	0.4	50	solid
RG-59	co-phased antennas	0.24	75	stranded

Fig. 2—Applications of coax types.

## BUYING CB COAXIAL CABLE

(continued)

### What is Coaxial Cable?

Technically, coax is a concentric, two-conductor cable (Fig. 1). The center conductor is made from solid or stranded copper or copper-coated steel wires. This is surrounded by an insulation, also known as the dielectric. Made from solid or foamed plastic, the dielectric separates the two conductors and helps determine the impedance of the cable.

The outer conductor also acts as a shield, and consists of a metallic braid, foil, or a combination of the two. The shielding prevents the escape of transmitted signal or the entry of interfering signals. The outer jacket protects the cable from environmental hazards such as moisture, oil, and dirt.

Most coaxial cables carry an RG or RG/U designation. This old military shorthand for Radio Guide is a convenient way to identify cable configurations.

### Which Is The Right Cable To Use?

RG-58—used mainly with mobile radios because of its small size (0.2 in. diameter) and flexibility which is increased with a stranded center conductor. It has an impedance rating of 50 ohms.

RG-8—best for long runs (50 ft. or more) at base stations. Larger and less flexible, it exhibits lower power loss characteristics, and also is rated at 50 ohms impedance.

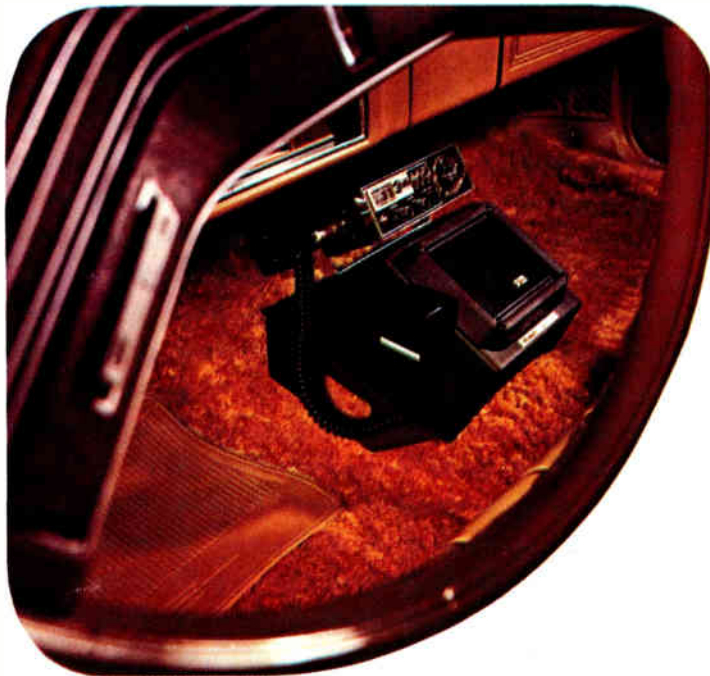
RG-59—flexibility and impedance rating (75 ohms) designate this cable for use with co-phased (or twin antenna) systems.

Other cables, such as RG-62, may have specialized applications for certain transceiver/antenna set-ups or impedance matching requirements. If you are unsure of what to use, check your owner's manual or consult a CB specialist, (Fig. 2).

The need to buy first quality cable is best illustrated by the importance of impedance matching. If the impedance of the cable differs from that of the system, standing waves result, creating a power loss. Standing wave ratios (SWR) measure the extent of the impedance mismatch. Poorly constructed cable may lack uniform impedance values throughout its length thereby reducing the effective power reaching the antenna by creating a large SWR.

Another common problem with low quality cable is the need to replace it more often. The life of a cable depends, of course, on the environment in which it works and the abuse it receives. For example, cable for a mobile radio receives much more flexing than base station cables—especially when the antenna is removed and reinstalled frequently. High quality cable has a jacket that stays flexible at low temperatures and for mobile applications, small stranding helps extend the cable's life.

Many—but not all—manufacturers employ a number of quality control checks to eliminate faulty cable before it leaves the factory. Checking adds to the cost, but these steps make the highest quality coax a better buy. Siekierka added a final word of caution: buy the best cable you can find, preferably marked with the manufacturer's or supplier's name. Its probably the least expensive component of your CB assembly, but vital to your broadcasting and reception.



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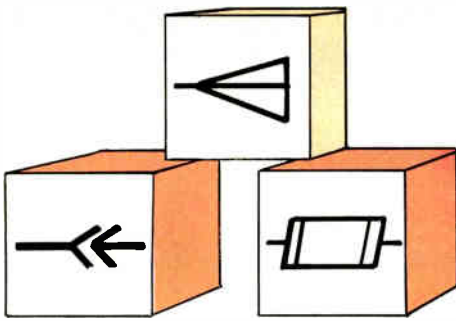
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# Basic Radio

by Irving Tepper

## Part 17 Parallel Resonance

**A** condition of resonance is not limited to the series LC circuit described earlier. Resonance can also occur when L and C are wired in *parallel*. The ideal parallel circuit contains only L and C but no resistances (Fig. 5.16A). At one specific frequency  $X_C$  will equal  $X_L$ , and parallel resonance will occur. The formula used to calculate the resonant frequency of a parallel LC circuit is the same as that used for the series resonant circuit

$$f_r = \frac{1}{2\pi\sqrt{LC}}$$

For values assigned in Fig. 5.16(A) the resonant frequency is

$$\begin{aligned} f_r &= \frac{1}{2\pi\sqrt{LC}} \\ &= \frac{1}{6.28\sqrt{7 \times 10^{-3} \times 5 \times 10^{-6}}} \\ &= 851 \text{ Hz} \end{aligned}$$

At resonance,  $X_C$  and  $X_L$  for the resonant circuit components may be calculated from

$$\begin{aligned} X_L &= 2\pi fL \\ &= 6.28 \times 851 \times 7 \times 10^{-3} \\ &= 37.4\Omega \end{aligned}$$

$$\begin{aligned} X_C &= \frac{1}{2\pi fC} \\ &= \frac{1}{6.28 \times 851 \times 5 \times 10^{-6}} \\ &= 37.4\Omega \end{aligned}$$

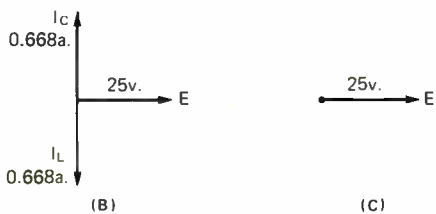
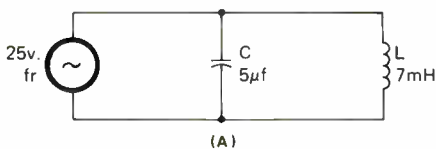


Fig. 5.16(A)—Parallel resonant circuit with no resistances (possible only theoretically). (B) Vector representation for circuit (A) and the resultant, (C).

The branch currents may then be found from

$$\begin{aligned} I &= \frac{E}{X_L} \\ &= \frac{25}{37.4} = 0.668A \\ I &= \frac{E}{X_C} \\ &= \frac{25}{37.4} = 0.668A \end{aligned}$$

The branch currents can be plotted as in Fig. 5.16(B) with the resultant shown in (C). We can conclude that in a theoretical parallel resonant circuit that contains no resistance, the currents in each branch cancel and no current is drawn from the source. Since the impedance of a parallel resonant circuit is determined from  $Z = E/I_T$  we find that for the theoretically perfect parallel resonant circuit, where L has zero resistance, the impedance will be infinite because since  $I_T$  equal zero

$$Z = 25/0 = \text{Infinity}$$

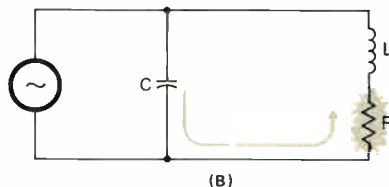
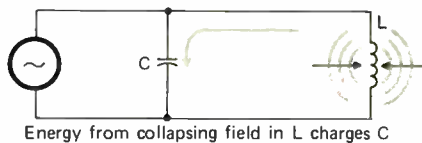
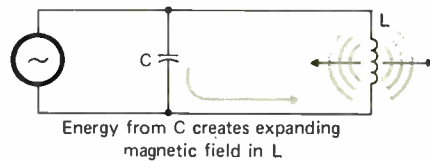


Fig. 5.17(A)—When the generator charges the capacitor it then discharges into the inductor. The inductor returns the energy to the capacitor and the two components continue to exchange the energy requiring none from the generator. (B) When resistance is part of the circuit, the energy dissipated in heat is not returned to the capacitor and must be made up by the generator.

While it may seem confusing to have two currents flowing, one in L and one in C, and yet have no current supplied by the generator, it can be explained. The energy from the capacitor discharges through the coil and is stored in the magnetic field. After the capacitor has discharged, the magnetic field collapses and the voltage generated across the coil recharges the capacitor. The capacitor then discharges into the coil and L and C continually exchange their energy (Fig. 5.17). As long as none of the energy is *lost* none need be replaced by the generator.

Since a perfect coil does not exist, energy is lost through the heat dissipated by the coil's resistance (Fig. 5.17B). Thus, each time the capacitor is recharged, the source must make up *only the losses*. The greater the loss the more current the generator has to supply and the lower the tank circuit impedance is. The impedance of a parallel resonant tank circuit can be calculated from

$$Z = \frac{X_L^2}{X_C + X_L + R}$$

Since  $X_L + X_C$  equals zero at resonance, we have

$$Z = \frac{X_L^2}{R}$$

*Currents in the Parallel Resonant Circuit*—Up to now we have only discussed the current drained from the

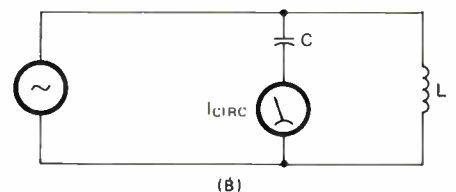
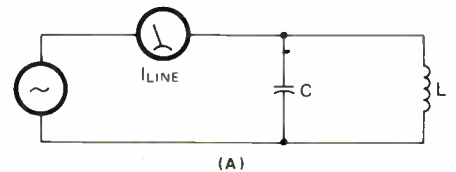


Fig. 5.18(A)—The current required by the parallel resonant tank circuit is defined as the line current. (B) The circulating current is the current exchanged between L and C.

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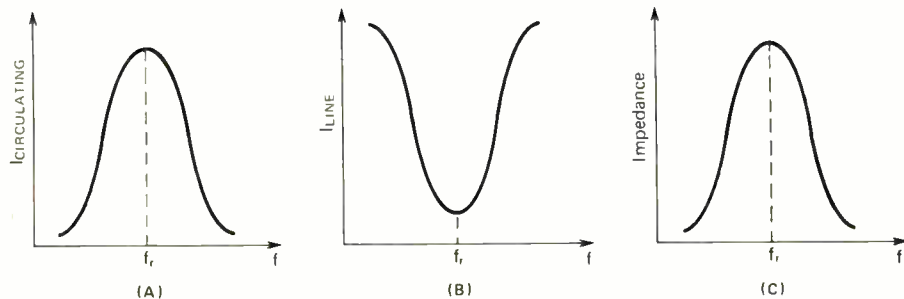
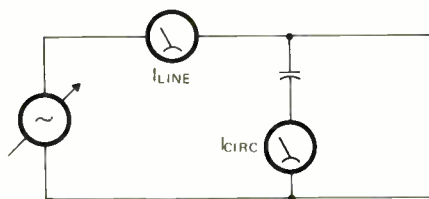


Fig. 5.19(A)—Plot of  $I_{circ}$  VERSUS frequency shows the circulating current to be at maximum when resonance occurs. (B) The line current is shown to be at minimum when resonance occurs. (C) Impedance is at maximum when the circuit is resonant.

source voltage, called the *line current* as shown in Fig. 5.18(A). There is a *second* current flow in the parallel resonant tank circuit, called the *circulating current* and it is measured as shown in Fig. 5.18(B). It is the current that is exchanged between the inductor and capacitor. At resonance this current is at maximum and decreases as the frequency is varied above and below resonance. A plot of the circulating current *versus* frequency is shown in Fig. 5.19(A). Also shown in (B) is a plot of *line current versus* frequency. Shown in (C) of Fig. 5.19 is a plot of impedance *versus* frequency.

### Circuit Q

Consider the following problem. Two resonant circuits (series or parallel) exist, each with the same values of L and C. While both circuits are resonant to the same frequency the *resistances* of each coil are different. How do they differ? How is it possible to compare the behavior of the two tuned circuits?

Let's analyze the operation of the two tuned circuits shown in Fig. 5.20. Both are resonant to the same frequency because L and C are the same values in each circuit, but the coil in circuit (A) has a resistance of 20 ohms while in (B) the coil resistance

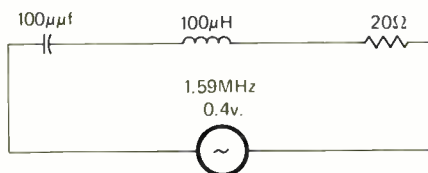
is 50 ohms. For the LC values given,  $f_r$  is approximately 1.59 MHz and the reactances are each, 1000 ohms. Since  $X_L$  cancels  $X_C$ , only R limits the current flow in each circuit. For circuit (A) I is 0.02A and for (B) it is 0.004A. The calculations for the voltage drops across each of the reactances are shown in Fig. 5.20.

Typical resonance curves for the two tuned circuits are shown in Fig. 5.21. They are placed on the same graph for easy comparison. Observe that curve (A) has a greater current amplitude at resonance than curve (B). Note also how wide curve (B) is compared to (A). Not only does curve (A) have a higher current flow at resonance but the current flow drops off more sharply on either side of the resonant frequency. *Figure of Merit-Q*—In order to be able to determine the type of resonance curve a tuned circuit will have, wide or narrow, we make use of a *figure of merit* for the tank circuit. The figure of merit is called the *Quality* and is abbreviated as Q. The Q of a tank circuit is equal to

$$Q = \frac{X_L}{R}$$

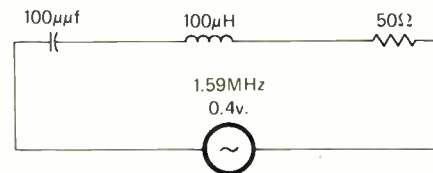
where Q = a number indicating the quality of tuned circuit.

$X_L$  = inductive reactance of the coil in ohms.



$f_r = 1.59\text{MHz}$   
 $X_C = 1000\Omega$   
 $X_L = 1000\Omega$   
 $Z \text{ at } f_r = R = 20\Omega$   
 $I \text{ at } f_r = E/R = 0.4/20 = 0.02\text{a}$   
 $E_{XC} = I \times X_C = 0.02 \times 1000 = 20\text{v.}$   
 $E_{XL} = I \times X_L = 0.02 \times 1000 = 20\text{v.}$   
 $E_R = I \times R = 0.02 \times 20 = 0.4\text{v.}$

(A)



$f_r = 1.59\text{MHz}$   
 $X_C = 1000\Omega$   
 $X_L = 1000\Omega$   
 $Z \text{ at } f_r = R = 50\Omega$   
 $I \text{ at } f_r = E/R = 0.4/50 = 0.008\text{a.}$   
 $E_{XC} = I \times X_C = 0.008 \times 1000 = 8\text{v.}$   
 $E_{XL} = I \times X_L = 0.008 \times 1000 = 8\text{v.}$   
 $E_R = I \times R = 0.008 \times 50 = 0.4\text{v.}$

(B)

Fig. 5.20(A)—High Q tuned circuit and its data. (B) Low Q tuned circuit and its data



R = total resistance of the coil.

We can now calculate the figures of merit for the resonant circuits of Fig. 5.20 as follows:

$$\text{For (A)} \quad Q = \frac{X_L}{R} \\ = \frac{1000}{20} = 50$$

$$\text{For (B)} \quad Q = \frac{X_L}{R} \\ = \frac{1000}{50} = 20$$

We can now make the following observations about the two resonant circuits in Fig. 5.20.

1. The tuned circuit with the lowest resistance has the highest figure of merit;  $Q = 50$ .
2. The tuned circuit with the highest  $Q$  has the highest current flow at resonance (Fig. 5.21, Curve A).
3. The tuned circuit with the highest  $Q$  has the sharper response curve.
4. The tuned circuit with the lowest  $Q$  has a low peak current at resonance.
5. The low  $Q$  tank circuit has the broadest resonance curve.

While  $Q$  is equal to  $X_L/R$  it may also be calculated from the relationship between  $E_{XL}$  and  $E_{gen}$  for the series resonant circuit.

$$\text{For (A)} \quad Q = \frac{E_{XL}}{E_{gen}} \\ = \frac{20}{0.4} = 50$$

$$\text{For (B)} \quad Q = \frac{E_{XL}}{E_{gen}} \\ = \frac{8}{0.4} = 20$$

By transposing we can see that

$$E_{XL} = Q \times E_{gen}$$

From this expression we can see that the voltage developed across the series

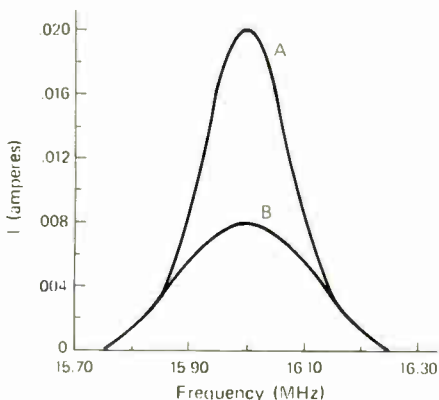


Fig. 5.21—Resonance curve A represents a tank circuit with a low resistance and therefore a high  $Q$ , while curve B illustrates the low  $Q$  tank circuit caused by resistance.

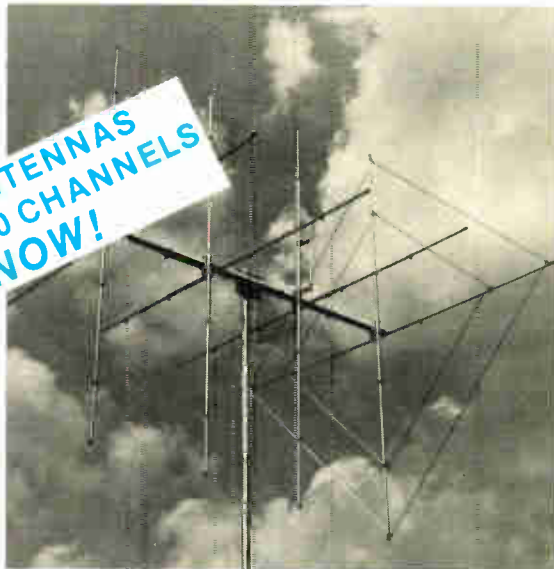
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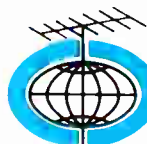
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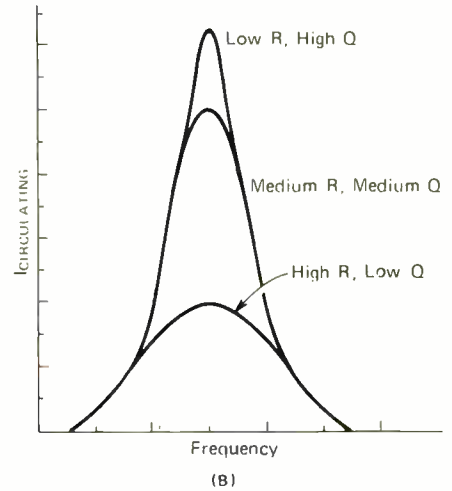
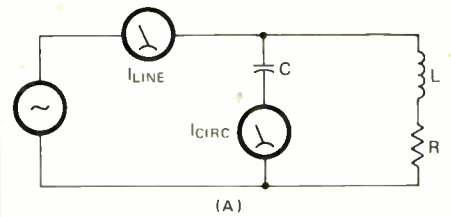


Fig. 5.22(A)—The coil resistance of the parallel resonant circuit also affects the Q. (B) Effect of resistance and Q upon the shape of the resonance curve.

inductor is controlled by the Q. The higher the Q the greater the voltage developed. Since the voltage across the coil (or the capacitor) is greater than the generator voltage it is considered a *gain* and that gain is proportional to the Q of the circuit.

For the parallel resonant circuit of Fig. 5.22(A) the circuit Q is also determined by the resistance of the coil. Again,  $Q = X_L/R$ . As the energy is exchanged between the coil and the capacitor, it must flow through the coil resistance. Energy is then dissipated by the resistance in the form of heat and *cannot be returned to the circuit*. Thus, only the energy stored in the coil or capacitor is useful while the resistance does not store but *dissipates* the energy. The loss caused by the resistance reduces the circulating current and increases the line current since the generator must make up all losses.

The Q of the parallel tank circuit also determines the shape and amplitude of the resonance curve as shown in (B) of Fig. 5.22. The lower the coil resistance, the higher the Q, the greater the amplitude of the curve and the steeper the slope of the curve. Q, line current and circulating current are also related as

$$Q = \frac{I_{CIRC}}{I_{LINE}}$$

Transposing, we have

$$I_{LINE} = \frac{I_{CIRC}}{Q}$$

$$I_{CIRC} = I_{LINE} \times Q$$

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**Bandwidth—Selectivity** — One of the most important uses for tuned circuits is the selection of one frequency and the rejection of all others. Basically this is how each CB channel is chosen, by tuned circuits. Observe how, in the resonance curves of Fig. 5.19 and 5.22, as we move away from the resonant frequency, current falls off rapidly. This means that only the signals at the resonant frequency will develop an output. But what happens when a second signal is present, one that is *close* to the resonant frequency? Can the tuned circuit keep out the second signal? The more sharply the current flow drops off on each side of resonance, the better able the tuned circuit is able to reject signals that are close to the resonant frequency.

**Bandwidth**—Three resonance curves are shown in Fig. 5.22(B). Other than indicating the Q of the tuned circuits that produced these curves, how can they be compared? Each curve is rated by its *bandwidth*, its *selectivity* or *sharpness*. An arbitrary standard has

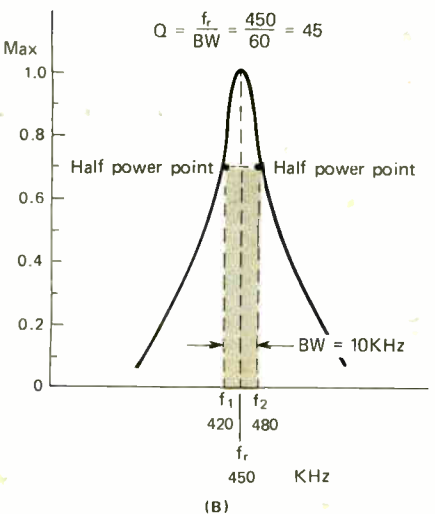
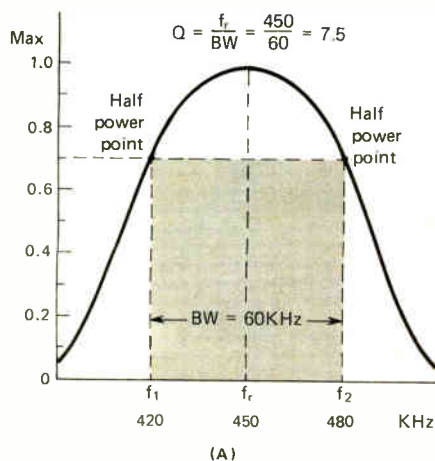


Fig. 5.23(A)—Bandwidth is measured at the half power points. Half power occurs when E or I drops to 0.707 of the maximum. Curve A represents a wide bandwidth. (B)—A narrow bandwidth curve.

been established to permit measurement of the bandwidth of a tuned circuit. The two frequencies on either side of resonance at which the circulating current has dropped down to a level low enough to produce *half power*, are known as the *half power points*. These are shown in Fig. 5.23. When the vertical axis of the resonance curve is measured in current or voltage, the half power point will occur when E or I drops to 0.707 of the maximum current flow at resonance. As shown in Fig. 5.23(A) the current drops to 0.707 at the 420 kHz ( $f_1$ ) and 480 kHz ( $f_2$ ). The range of frequencies between these two points is known as the *bandwidth* abbreviated *BW*. The bandwidth is calculated from

$$\begin{aligned} BW &= f_2 - f_1 \\ &= 480 - 420 \\ &= 60 \text{ kHz} \end{aligned}$$

For curve (B) of Fig. 5.23 the bandwidth is

$$\begin{aligned} BW &= f_2 - f_1 \\ &= 455 - 445 \\ &= 10 \text{ kHz} \end{aligned}$$

Since curve (B) has the narrower bandwidth we understand *that* tuned circuit to have the highest Q. Band-

width and Q are mathematically related by

$$Q = \frac{f_r}{BW}$$

The Q of the tuned circuits that produced curves (A) and (B) of Fig. 5.23 can be calculated as

$$\begin{aligned} \text{Curve (A)} \quad Q &= \frac{f_r}{BW} \\ &= \frac{450}{60} = 7.5 \end{aligned}$$

$$\begin{aligned} \text{Curve (B)} \quad Q &= \frac{f_r}{BW} \\ &= \frac{450}{10} = 45 \end{aligned}$$

When we transpose the above formula for BW, we have

$$BW = \frac{f_r}{Q}$$

From this we can see that as the Q of a tank circuit is increased the bandwidth of the circuit narrows and is said to be *sharper* or *more selective*.

There are two additional points to note before moving ahead. Earlier, we noted that the impedance of a parallel resonant tank circuit could be determined from

$$Z = \frac{X_L^2}{R}$$

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## Experiment #19—Tuned Circuits

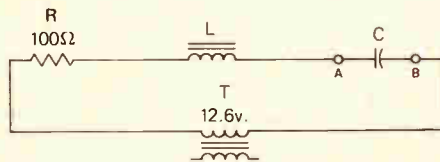
### Materials:

- 1—Chassis constructed in Experiment #16
- 1—Roll of #32 enameled wire, Radio Shack #278-011
- 14—4" 20D common nails
- 2—4.7  $\mu$ f, 50V capacitors, Radio Shack #272-1041
- 1—10  $\mu$ f, 35V capacitor, Radio Shack #272-1013
- 1—100 ohm  $\frac{1}{2}$  watt resistor, Radio Shack #271-012
- 1—VOM, Radio Shack #22-202A

The purpose of this experiment is to reinforce the concepts involved in series and parallel resonant circuits. Because of the nature of the equipment used in the experiment, the results are not precise but they do confirm the principles of resonant circuits.

Since the only frequency available to us at this time is 60 Hz from the power line, we must vary the resonant frequency of the tuned circuits. While this can be done by varying L or C it is easier for us to vary C. The 60 Hz voltage will be obtained from the secondary of the step down transformer on the chassis. It is rated at 12.6 VAC but can read as high as 15 VAC without a load.

The inductor, with the core made up from fourteen nails, provides approximately 1.2H of inductance. The DC resistance of the coil is 150 ohms and it requires approximately 6  $\mu$ f to resonate 1.2H at 60 Hz.



- R = 100 $\Omega$ ,  $\frac{1}{2}$  w.
- L = Roll of No. 32e wire with 14—4" 20D common nails in core
- C = 2.9 $\mu$ f  
3.2 $\mu$ f  
4.7 $\mu$ f  
7.9  $\mu$ f  
10.0 $\mu$ f
- T = Part of chassis from Experiment No. 16

Fig. 1—Series resonant circuit to be wired on the chassis.

### Part I—Series Resonance

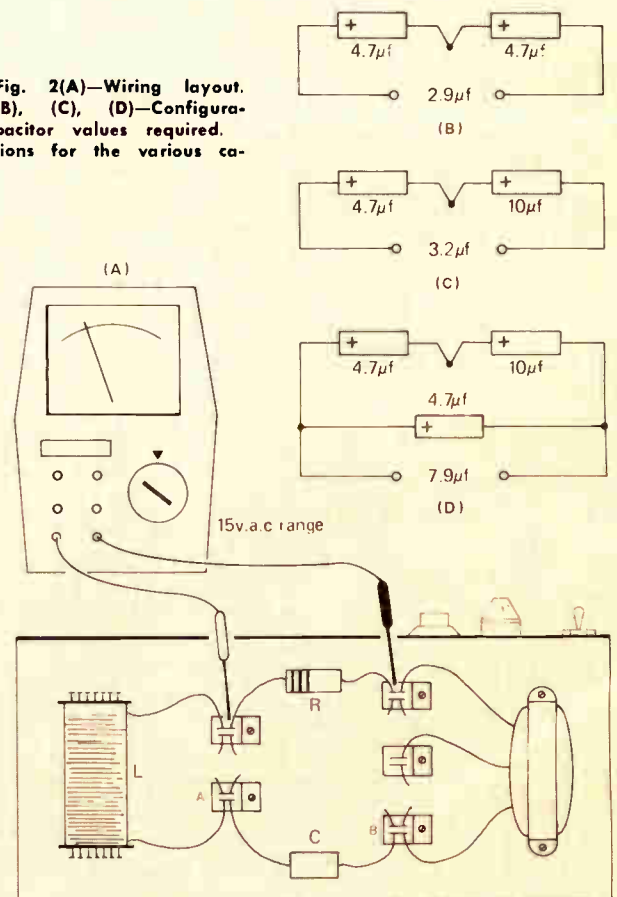
With the inductor and a 6  $\mu$ f capacitor in series,  $X_L$  and  $X_C$  will cancel and the current flow in the circuit will be at maximum limited only by the 100 ohm resistor plus the 150 ohm DC resistance of the coil. By substituting different capacitor values and observing the current flow, indicated by the voltage drop across the 100 ohm resistor, we can roughly plot the behavior of the circuit and recognize the resonance curve.

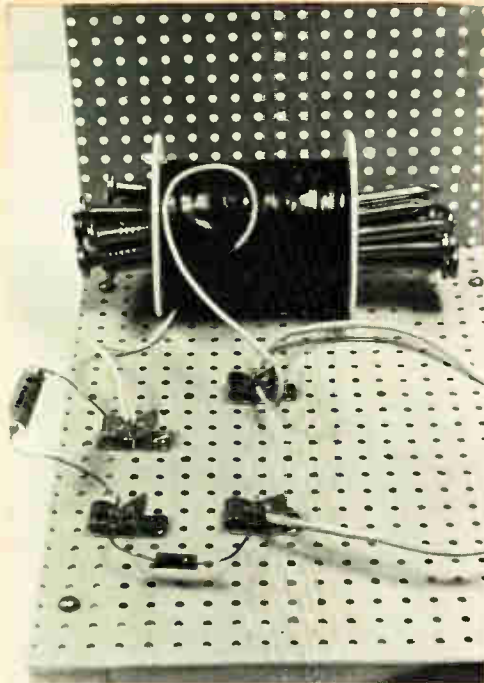
#### Procedure:

1—Wire the circuit shown in Fig. 1 using the layout of Fig. 2(A). Slip the nails through the center of the coil form.

2—Connect the capacitor values listed in Chart I across terminals A and B on the board. Form these

Fig. 2(A)—Wiring layout. (B), (C), (D)—Configuration capacitor values required.





Component and wiring arrangement for the circuit of Fig. 1. The voltmeter is connected across the 100 ohm resistor in the foreground. The coil is wrapped with plastic tape to prevent the wire leads from breaking the thin #32 wire. The coil core is made up of 14-20D common nails. Photo by I. Kahn.

capacitor values by the combinations shown in Fig. 2(B), (C) and (D).

3—Enter the voltage readings across R, for each capacitance, in Chart I.

4—Calculate the approximate resonant frequency for each combination of L and C (based on  $L = 1.2\text{H}$ ) and enter these frequencies in the appropriate column of Chart I.

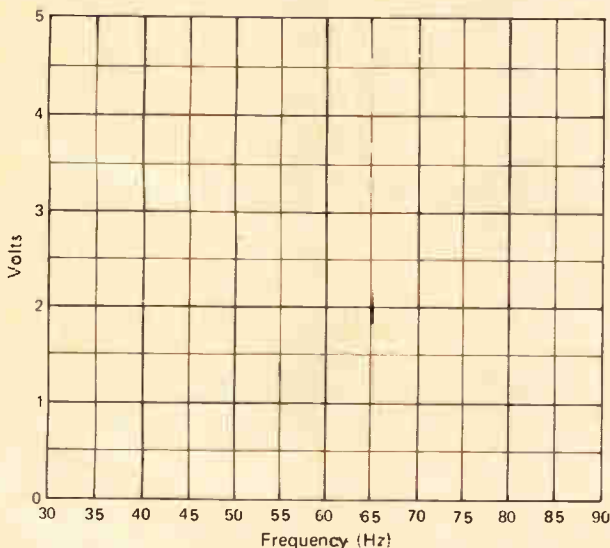


Fig. 3—Graph to plot the resonance curves.

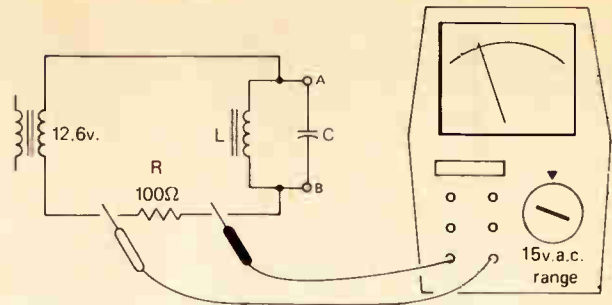


Fig. 4—Circuit for determining the parallel resonant tank circuit characteristics.

5—Plot a graph of the voltage versus frequency in Fig. 3 using the data from Chart I and note that the point of minimum current is at or close to 60 Hz.

C ( $\mu\text{f}$ )	$E_R$ (volts)	$f_r$ (Hz)
2.35		
3.2		
4.7		
7.9		

10

Chart I

### Part II—Parallel Resonance

6—Wire the circuit shown in Fig. 4. Note that the 100 ohm resistor is no longer part of the tuned circuit. This results in a higher Q.

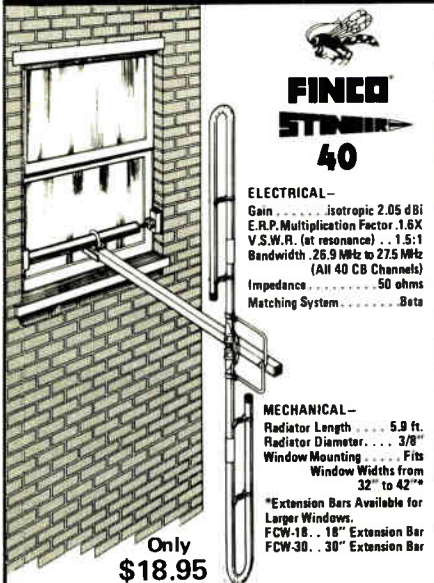
7—Connect the various capacitance values, listed in Chart II, across terminals A and B of Fig. 3. Record the voltage drops across the 100 ohm resistor in the appropriate places in Chart II.

C	$E_R$ (volts)	$f_r$ (Hz)
2.35		
3.2		
4.7		
7.9		
10		

Chart II

8—Using the resonant frequencies from Chart I and the data from Chart II, plot a response curve for the parallel resonant circuit on the graph of Fig. 3.

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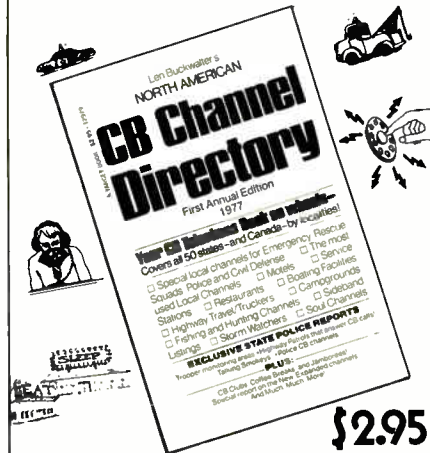
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This expression can be expanded to

$$Z = \frac{X_L \times X_L}{R}$$

We also know that

$$Q = \frac{X_L}{R}$$

Thus, we may substitute Q for  $X_L/R$   
and we have

$$Z = QX_L$$

The second point is that since

$$Q = \frac{X_L}{R}$$

and

$$X_L = 2\pi fL$$

then by substitution

$$Q = \frac{2\pi fL}{R}$$

From this, we can draw the conclusion that Q varies with frequency and *we would be wrong*. The resistance, R, is not only the pure DC resistance of the coil but the total resistance,  $R_{DC}$  plus  $R_{AC}$ . Now what is the AC resistance? We are *not* talking about reactance or impedance here. When low frequency AC currents flow through a wire they behave exactly as direct currents, they flow through the entire cross-section of the conductor as in (A) and (B) of Fig. 5.24. As the frequency of the AC *increases*, the current flow tends to move away from the center of the conductor and flow close to the surface area as in (C). As the frequency of the signal increases further the current flows closer and closer to the surface of the wire (D). This reduces the *effective cross sectional area* and increases the resistance of the wire to AC signals. This behavior is defined as skin effect.

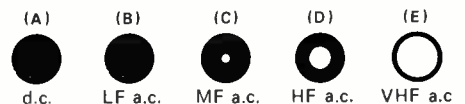


Fig. 5.24(A)—When direct current flows through a wire it does so through the entire cross section. For (B) LF AC, the behavior is the same. As the frequency of the alternating current increases the flow moves closer and closer to the surface (C), (D) and (E).

As a result of the skin effect, as the frequency rises, R *also* rises along with  $X_L$ . Since *both* values are rising the ratio that represents Q remains constant over a fairly wide range of frequencies.

### Time Constants

It was explained earlier that a capacitor does not reach a fully charged state instantly but takes a small amount of time to accomplish this. When a resistor is placed in *series* with the capacitor, as shown in Fig. 5.25(A), a longer time is required for the capaci-

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tor to charge. The length of time needed to charge the capacitor is determined by the values of both the resistor and capacitor. The series resistor controls how rapidly the electrons can be supplied and the capacitor value determines how many electrons are required for a full charge. Thus, the total time required to charge the capacitor is controlled by the values of R and C.

**RC Time Constant**—The time needed for a capacitor to charge to 63.2% of the charging voltage is known as the RC time constant or simply the time constant (abbreviated TC) of the network. This is illustrated in Fig. 5.25(B).

The TC may be expressed mathematically as

$$T = RC$$

where T = one TC in seconds

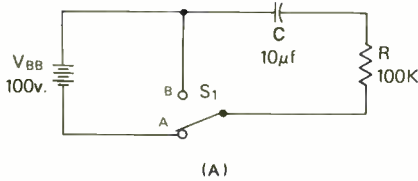
R = resistance of the circuit in ohms

C = capacitance of the circuit in farads

If, for example, the values in the circuit of Fig. 5.25(A) are  $V_{BB} = 100V$ ,  $C = 10 \mu f$  and  $R = 100K$ , the time constant will be:

$$\begin{aligned} T &= RC \\ &= 10^5 \times 10 \times 10^{-6} \\ &= 10^{-1} = 1 \text{ second} \end{aligned}$$

Fig. 5.25(A)—Circuit for analyzing the RC time constants. The capacitor charges with the switch in position A and discharges with the switch in position B. (B)—The charge on C increases 63.2% each TC until after 5 TC the capacitor is considered to be fully charged. (C)—The current drops 63.2% each TC and after 5 TC is at zero, approximately. (D)—Curve shows that the discharge rate of the RC circuit takes 5 TC to discharge to approximately zero volts.



This means that in one second the voltage across the capacitor would rise to 63.2% of 100 volts or 63.2 volts. Thus  $e_1 = 63.2V$ .

The capacitor will continue to charge after one TC. During the second TC, also 1 second in duration, the capacitor will charge to 63.2% of the remaining voltage between  $V_{BB}$  and the existing charge. Thus, the voltage increase in the second TC will be equal to

$$\begin{aligned} e_2 &= (V_{BB} - e_1) 0.632 \\ &= (100 - 63.2) 0.632 \\ &= 36.8 \times 0.632 = 23.2576V \end{aligned}$$

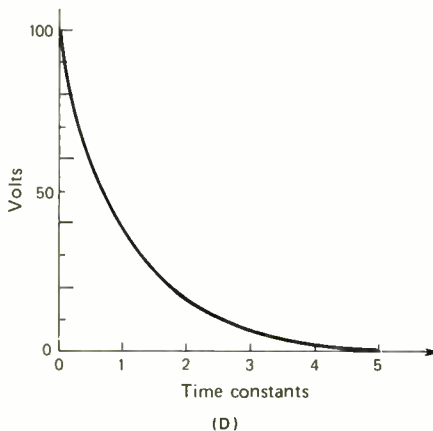
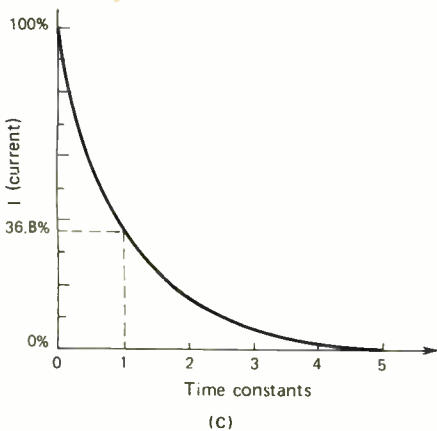
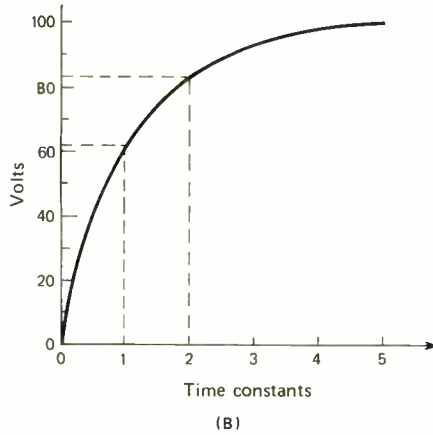
This means that after two TC the charge will be equal to the sum of 63.2V and 23.2576V, or 86.45V.

For the third TC, the charge will increase 63.2% of the new difference.

$$\begin{aligned} e_3 &= (V_{BB} - e_2) 0.632 \\ &= (100 - 86.45) 0.632 \\ &= 13.55 \times 0.632 \end{aligned}$$

Now, the total charge after three TC (three seconds) is equal to  $e_1 + e_2 + e_3$ , or 63.2V plus 23.2576V plus 8.564V for a total of 95.014V.

Repeating the calculations for the fourth and fifth time constants, we find that by the fifth TC the capacitor has charged to 99% of the applied voltage,  $V_{BB}$ . From this we can conclude that in a series RC circuit, the capacitor re-

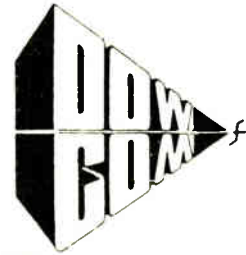


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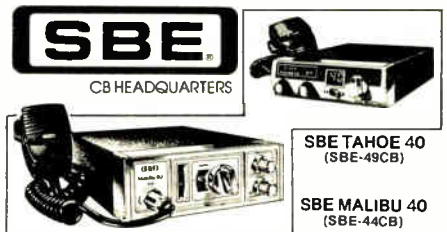
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quires five time constants to charge to the source voltage (Fig. 5.25B).

Recall also, that in a charging capacitor the current and voltage vary inversely. The charging current which starts at maximum will drop 63.2% to 36.8% of its maximum charging current in one TC. (See Fig. 5.25C.) In five time constants the charging current has dropped to almost zero.

**RC Circuit Discharge**—When, in the circuit of Fig. 5.25(A), switch  $S_1$  is thrown to position B, the source voltage is removed from the RC network and a path is provided so that C may discharge through R. The same amount of time will be required for the capacitor to discharge fully as was necessary for it to charge fully, five time constants. The discharge curve shown in Fig. 5.25(D) shows that the voltage drops to 63.2% of the full charge voltage (equal to the source  $V_{BB}$ ) during the first TC and then 63.2% of the remaining voltage. After five time constants the charge on the capacitor has dropped to zero volts and it is considered discharged.

**RL Time Constants**—It was explained earlier, when discussing inductance, how the counter EMF prevented the current flowing through an inductor from rising to its maximum value immediately. The time required for the

current in an RL circuit to rise to 63.2% of the maximum value is known as the *time constant*, TC, just as for the RC circuit. The TC for an RL circuit can be calculated from

$$T = \frac{L}{R}$$

where  $T$  = one TC in seconds  
 $L$  = the inductance of the circuit in Henries  
 $R$  = the resistance of the circuit in ohms

If, for example, the values in the circuit of Fig. 5.26(A) are  $V_{BB} = 100V$ ,  $L = 2H$  and  $R = 100$  ohms, the time constant would be

$$T = \frac{L}{R} = \frac{2}{100} = 0.02 \text{ seconds}$$

In 0.02 seconds (20 milliseconds) the current will rise to 63.2% of its maximum value (Fig. 5.26B). The maximum value of the current, determined by Ohm's law, is

$$I = \frac{E}{R} = \frac{100}{100} = 1A$$

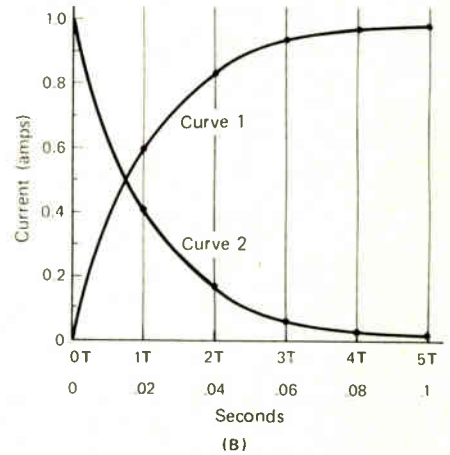
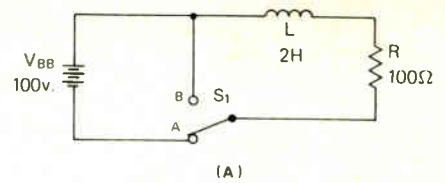


Fig. 5.26(A)—Circuit used to analyze RL time constants. The inductor charges with  $S_1$  in position A and when  $S_1$  is switched to B, the inductor discharges. (B)—Inductor charging and decay curves described in the text.

Thus, after one TC the current will be 63.2% of 1A or 0.632A. During the second TC the current will rise 63.2% of the remaining current. Each TC will produce a 63.2% rise in the remaining current until after five time constants, I will be at approximately the maximum value, 1A.

The current decay is also governed by the TC and will drop off at the same rate when  $S_1$  is switched to position B. As shown in curve 2 of Fig. 5.26(B), the current will almost completely decay in five time constants, always dropping 63.2% of the remaining current each additional TC.

**Universal TC Chart**—A comparison of Fig. 5.25 and 5.26 reveal a similarity between curves developed by the RL and RC circuits. The growth and decay in both circuits follow the same *exponential curve*. Because of this it is possible to develop a set of universal curves that may be used for both types of circuits. This universal TC chart will

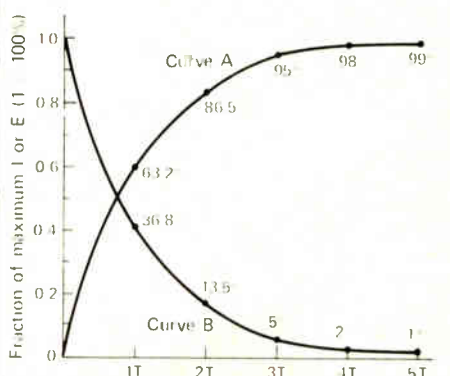


Fig. 5.27—A universal TC chart.

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aid in the solution of any problems involving time constants. The universal TC chart, shown in Fig. 5.27, has two curves. Curve A may be used to determine the:

- 1—Voltage rise across the capacitor in an RC circuit.
- 2—Current rise in the RL circuit.
- 3—Voltage across the resistor in the RL circuit.

Curve B in Fig. 5.27 may be used to determine the:

- 1—Charging current in an RC circuit.
- 2—Resistor voltage drop in a charging RC circuit.
- 3—Current decay in a discharging RL circuit.

To illustrate the use of the universal time constant chart let's solve the following problem for the circuit of Fig. 5.28 for the values shown. Find:

- 1) TC
- 2)  $I_{\text{maximum}}$
- 3)  $e_c$  at 7.5 ms
- 4)  $e_R$  at 10 ms

1) Calculate the TC.

$$\begin{aligned} T &= RC \\ &= 500 \times 5 \times 10^{-6} \\ &= 0.0025 \text{ seconds} \\ &= 2.5 \text{ milliseconds} \end{aligned}$$

2) Calculate  $I_{\text{max}}$ —Since at time zero the capacitor is uncharged and equivalent to a short circuit, the maximum current flow will be determined by E and R. Therefore,

$$\begin{aligned} I &= \frac{E}{R} \\ &= \frac{100}{500} = 0.2A \end{aligned}$$

3) Find  $e_c$  at 7.5 ms. To do this it is first necessary to determine how many time constants are represented by 7.5 ms. This is done by dividing the elapsed time by the TC.

$$\begin{aligned} \text{Number of TC} &= \frac{\text{TIME}}{\text{TC}} \\ &= \frac{7.5 \text{ ms}}{2.5 \text{ ms}} = 3 \text{ TC} \end{aligned}$$

Refer to the universal time constant chart, Fig. 5.28, Curve A, and observe that for 3T,  $e$  is 95% of the applied voltage,  $V_{\text{BB}}$ .

$$\begin{aligned} e_c \text{ at } 3 \text{ TC} &= V_{\text{BB}} \times 0.95 \\ &= 100 \times 0.95 = 95V \end{aligned}$$

4) To find  $e_R$  at 10 ms we must first

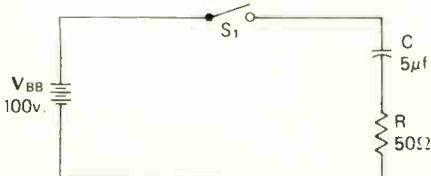


Fig. 5.28—TC problem computed in the text.



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## Experiment #20—Time Constants

### Materials:

- 1—Chassis constructed in Experiment #16
- 1—100K, ½ watt resistor, Radio Shack #271-045
- 1—100 μf, 50 volt capacitor, Radio Shack #272-1044
- 1—9V battery and clip lead
- 1—VOM, Radio Shack #22-202A

While the TC of an RC network can be calculated from  $T = RC$ , it can also be measured with fair accuracy if the error introduced by the measuring instrument is taken into account. The basic circuit used to measure TC is shown in Fig. 1. If you are going to wait for C to charge to 9 volts, you will be disappointed as it will charge to no more than 6.75 volts. The reason for this can be understood from the circuit in Fig. 2. Here the voltmeter is shown as the resistance it represents in the circuit. A 20KΩ/V meter set on the 15 volt range represents a resistance of 300K. As a result of the voltage divider action between  $R_M$  and  $R_S$  we can get no more than ¾ of the input voltage to appear across C. Keeping this in mind, start the experiment as outlined below.

### Part I—Charging Time

- 1—Calculate the TC of the RC network composed of a 100K resistor in series with 100 μf. \_\_\_\_\_ sec.
- 2—Calculate the charge that should appear across C after 1 TC given a maximum voltage of 6.75 because of the voltage divider. \_\_\_\_\_ V, 1 TC.
- 3—Wire the circuit shown in Fig. 3 but do not connect the positive terminal of the battery until directed to do so.
- 4—Using a stop watch or a watch with a sweep second hand, time how long it takes for the capacitor to charge to 4.266 volts when the positive battery lead is connected. A second person would be a help at this point. 4.266V = \_\_\_\_\_ sec.

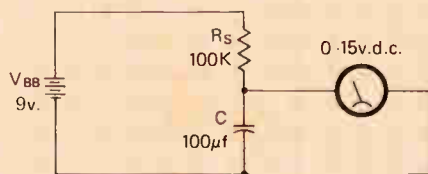
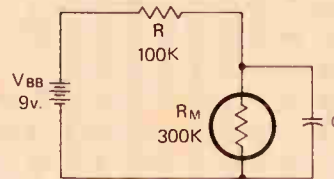


Fig. 1—Basic circuit used to measure the voltage charge across the capacitor.



$$E_{RM} = \frac{300K}{300K + 100K} \times V_{BB}$$

$$= 0.75 \times 9 = 6.75v.$$

Fig. 2—The equivalent circuit of Fig. 1 showing how the meter resistance forms a voltage divider with  $R_S$ .

- 5—Remove the positive battery connection from the circuit and discharge the capacitor by placing a short circuit across it.
- 6—Reconnect the battery and measure the voltage every 10 seconds as it rises. Using these figures, plot the charge curve on the graph of Fig. 4.

### Part II—Discharging Time

When the battery is disconnected from the circuit, the capacitor will begin to discharge immediately. Examining the circuit shown in Fig. 2, it should be apparent that when the capacitor discharges the current path will be *through the meter*. Since the meter resistance is 300K the discharge circuit will have a *different time constant than the charging*

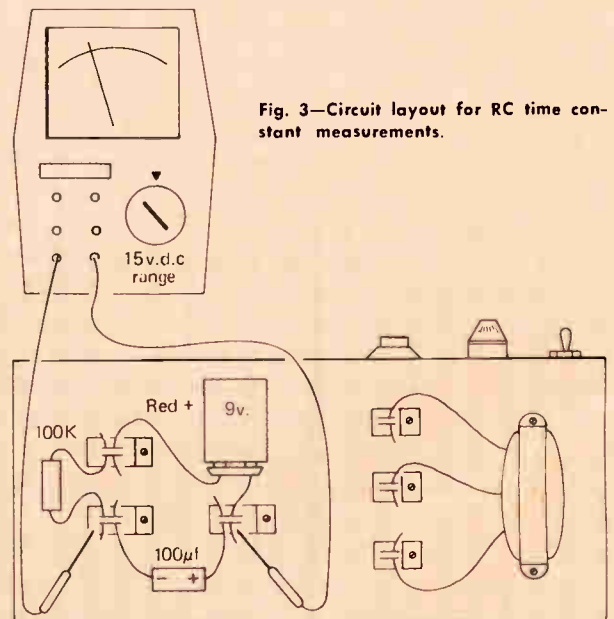
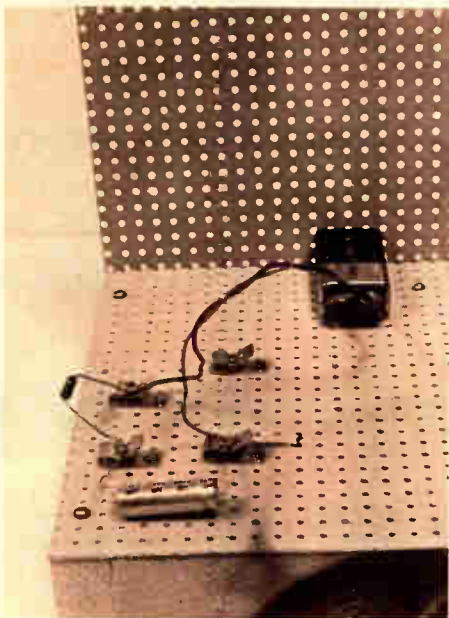


Fig. 3—Circuit layout for RC time constant measurements.



Component wiring and wiring arrangement for the circuit of Fig. 1. The voltmeter should be connected across the 100K resistor on the left. The positive lead of the battery remains disconnected until you are ready to time the voltage rise. Photo by I. Kahn.

circuit in which the current had to flow through 100K. The discharge TC is equal to

$$\begin{aligned}
 T &= RC \\
 &= 300 \times 10^3 \times 100 \times 10^{-6} \\
 &= 30 \text{ seconds}
 \end{aligned}$$

Thus, to plot the discharge curve for this circuit we will have to measure the voltage every 30 seconds as it drops.

7—Using the circuit of Fig. 3 charge the capacitor to maximum, 6.75V.

8—Remove the battery and note the voltage every 30 seconds over a period of 150 seconds, 5 TC.

9—Plot the voltage points on the graph of Fig. 4 to observe the discharge curve. The same graph can be used for both curves since the calibration is in TC not time.

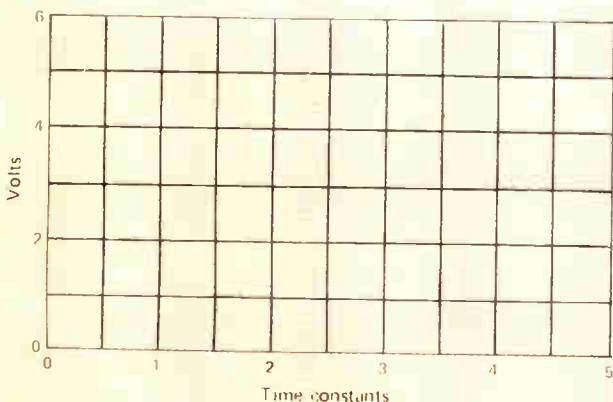


Fig. 4—Graph for plotting charge and discharge curves of the capacitor in Fig. 3.




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determine the number of TC represented by 10 ms. This is done as in step 3 above:

$$\text{Number of TC} = \frac{10 \text{ ms}}{2.5 \text{ ms}} = 4 \text{ TC}$$

Again, refer to the universal time constant chart, using Curve B. At four time constants,  $e_R$  is 2% of  $V_{BB}$ . Thus:

$$e_R \text{ at } 4 \text{ TC} = 100 \times 0.02 = 2V.$$

### Time Constant and Frequency

One of the areas in electronics in which time constants play an important role is coupling circuits. As explained previously, it is frequently necessary to transfer an AC signal from one circuit to another but block the DC component. How this is done is shown again in Fig. 5.29(A). The time constant of the RC network must be selected based on the frequency and wave-shape of the signal being coupled.

The time constant of a network can be defined as being *short*, *medium* or *long* but only in comparison to the signal being coupled. These time periods may be defined as follows for sine waveforms.

**Long TC**—A TC that *exceeds* by ten times the period of the input waveform (Fig. 5.29B).

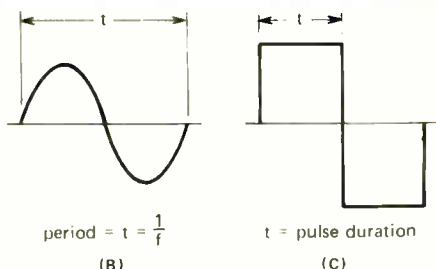
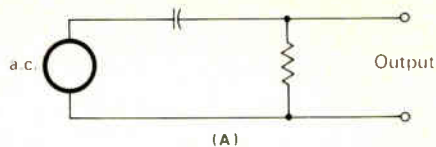


Fig. 5.29(A)—Basic RC coupling circuit. (B)—The period of a sine wave and how it is calculated. (C)—Definition of the pulse duration of a square wave.

**Medium TC**—A TC that is *equal* to the period of the input waveform.

**Short TC**—A TC that is *one tenth* of the period of the input waveform.

The same rules apply to waveforms that are not sine (called nonsinusoidal waveforms) except that for square waves the TC is compared to the *pulse duration* (Fig. 5.29B) rather than the period, since for a square wave the period has little meaning.

**Sine Wave Signals**—When coupling sine wave signals using the circuit of Fig.

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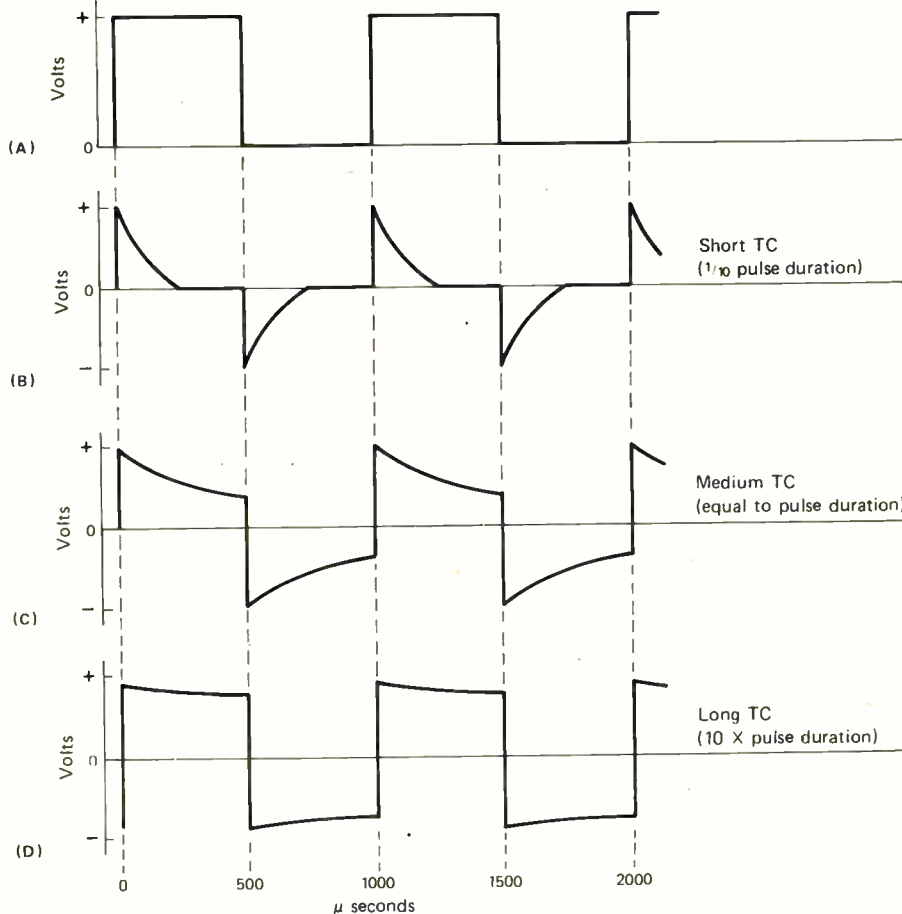


Fig. 5.30(A)—Square wave with a pulse duration of 500 microseconds. (B)—Output waveform after coupling through a short TC circuit. (C)—Output waveshape after coupling through a medium TC circuit, and (D)—the effect of a long TC circuit.

5.29(A), the time constant is not critical because it does not affect the *wave-shape* of the coupled signal, only its amplitude and phase. Coupling the sine-wave signal through an RC circuit with a long TC introduces a slight drop in the signal amplitude and a slight phase shift. As the time constant is reduced, the phase shift increases, the amplitude *decreases* but the wave shape remains unchanged.

**Coupling Square Wave Signals**—When coupling square wave signals through the circuit of Fig. 5.29(A) the TC affects the output signal *waveshape*. As shown in Fig. 5.30(A), the signal is a square wave of 1000 Hz; it has a pulse duration of 500  $\mu$ seconds and a period of 1000  $\mu$ seconds. When this signal is applied to a coupling network with a short TC (50  $\mu$ sec) the resultant output waveform is as shown in Fig. 5.30(B). When the square wave is applied to a coupling network with a medium TC (500  $\mu$ sec) the resultant output wave is as shown in Fig. 5.30(C). For a long TC coupling network (5000  $\mu$ sec) the output waveshape is almost unchanged as in Fig. 5.30(D).

Time constants are also of importance in other areas such as filter circuits and wave shaping networks and will be discussed in greater detail later.

**More About Calculators**—In the last installment we suggested the use of a Radio Shack calculator model 65-638. We have found since that it is no longer in production. A very satisfactory substitute is the Radio Shack 65-637. If the 65-637 is not available locally then a Texas Instrument TI-30, while physically larger, is comparable mathematically. Both calculators are capable of calculating the arc trigonometric functions although each is labelled differently. The arc function is used to find the angle  $\theta$  in the AC computations described last installment. The arc functions, arcsine, arccosine and arctangent are the trig functions *reversed*. Arcsine simply means "the angle whose sine is \_\_\_\_\_" and is written as  $\sin^{-1}$ ; Arccosine means "the angle whose cosine is \_\_\_\_\_"; Arctangent means "the angle whose tangent is \_\_\_\_\_." For example, if we know the sine to be 0.5 we enter this into the calculator, press the *arc* function and then the *sine* function and 30° appears as the answer.

To find the angle whose cosine is 0.866 enter this into the calculator, press *arc* and *cosine* functions and the answer, 30°, will appear on the readout. The same procedure may be followed to find the angle of the tangent.

The Texas Instrument TI-30 performs the same operations but the arc function button is labelled INVERSE.



The Radio Shack EC-480 and the Texas Instrument TI-30 have approximately the same mathematical capabilities and both are most suitable for the math encountered in this series. The Radio Shack calculator is smaller because it only has 20 keys compared to the 40 keys on the TI-30. Each key on the calculator serves two functions, selected by the F button. The Radio Shack is powered by two AA cells and the TI by a 9 volt battery. Separate AC operated power supplies are available for each. Photo by I. Kahn.

#### NEXT MONTH

The next installment will cover transformer theory and experiments.

(continued)

#### Suggested Reading

Schrader, R. L. Electronics Communications, Third Ed., New York: McGraw Hill, pp. 131-134, 138

Tepper, Marvin, Basic Radio, Second Ed., Vol. II, Rochelle Park, New Jersey: Hayden Book Co., pp. 94-98, 121-129.

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## Self Check Questions

1—When the LC components of a series resonant circuit are rewired into a parallel resonant circuit, for the same values of L and C, we will develop a different resonant frequency. T or F.

2—A resonant circuit that consists of fixed values of L and C will resonate at more than one frequency. T or F.

3—Calculate the resonant frequency of a parallel resonant tank circuit that has an L of 500 microhenries and a C of 300  $\mu\text{f}$ .

4—Calculate the inductive reactance of the 500 microhenry coil at resonance in problem 3, above.

5—If the tank circuit of problems 3 and 4 had absolutely no resistance, what would its impedance be equal to?

6—Given a Q of 60 for the tank circuit of problem 3, find the impedance.

7—A parallel resonant tank circuit, at resonance draws a high line current. T or F.

8—A parallel resonant circuit, at resonance, has a high circulating current. T or F.

9—In a high Q tank circuit the total coil resistance would be (high-low) \_\_\_\_\_.

10—When a circuit is resonant both the capacitor and inductor store energy at the very same time. T or F.

11—Q of a tank circuit is always measured at:

- A) the 0.707 points
- B)  $f_1$  or  $f_2$
- C) resonance
- D) any of the above

12—What is the Q of the tank circuit whose inductor is 2.5 mH, has a total resistance of 230 ohms and is resonant at 400 MHz?

13—It is desired to design a tuned circuit that is very selective. Two coils are available that are exact in all respects,

except one has a high resistance, the other a low resistance. Which coil should be selected?

14—A series resonant circuit is powered by a generator that produces 10 VAC. The voltage drop across the capacitor is 78 VAC. What is the Q of the circuit?

15—The bandwidth of a tuned circuit is measured between the two half power points at 0.707 of the maximum current or voltage, at resonance. T or F.

16—A circuit, resonant at 455 kHz has a BW of 5 kHz. What is the Q of the circuit?

17—A tuned circuit with a Q of 300 is resonant at 670 kHz. What is its BW?

18—What is the relationship between the Q of a tuned circuit and its bandwidth?

19—The resistance to the flow of AC through a wire is fixed regardless of the frequency of the current. T or F.

20—Define a "time constant."

21—An RC circuit contains a 200 K resistor in series with a 2  $\mu\text{f}$  capacitor. What is the time constant of the network?

22—How many TC, approximately, does it take for a capacitor to fully charge or discharge?

23—The shape of the charge and discharge curves of L and C components are called "exponential." T or F.

24—A 2 mH inductor in series with 50K has a TC equal to \_\_\_\_\_.

25—The time constant of a coupling network such as that in Fig. 5.29(A), that has to handle sine waves only, is totally uncritical and has no effect on the circuit behavior. T or F.

26—A TC that is 1/10 the duration of the period of a square wave is considered to be a short TC. T or F.

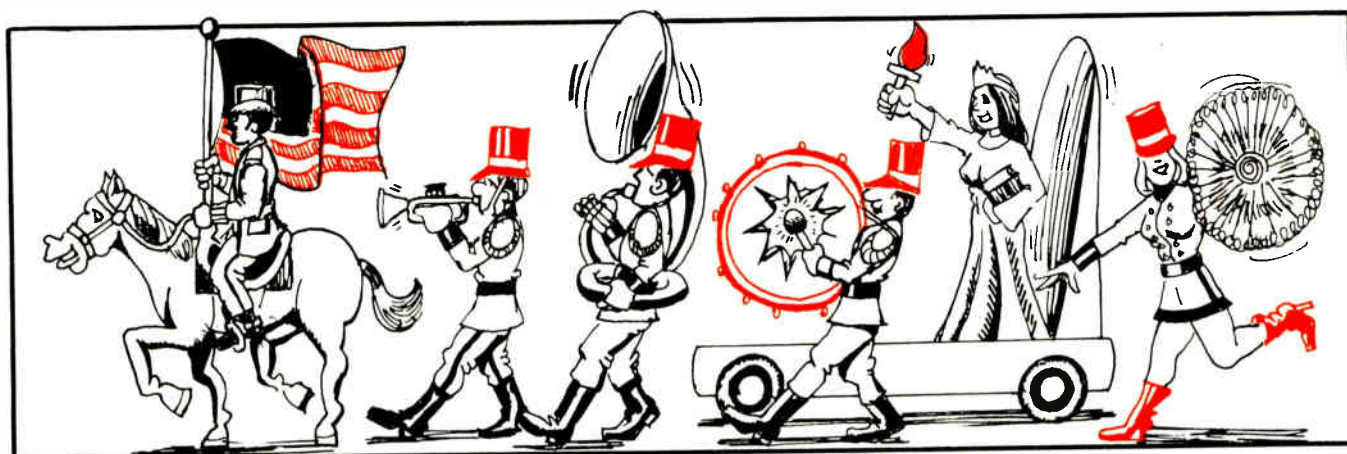
27—A short TC coupling circuit has a major effect on the waveshape of a square wave. T or F.

**Self-Check Answers**

1—F  
2—F  
3—411.15 kHz  
4—1.291K  
5—Infinity  
6—Z =  $X_L Q = 77.46K$   
7—F  
8—T  
9—Low  
10—F. They exchange the energy.  
11—C  
12— $X_L = 6280, R = 230$  ohms,  $Q = 27.3$   
13—The low resistance coil.  
14— $Q = E_{XL}/E_{R_{tot}}$ . Since at resonance  $X_L$  equals  $X_C$  then  $Q$  also equals  $E_{XC}/E_{R_{tot}} = \frac{10}{78} = 7.8$ .  
15—T  
16— $Q = 91$   
17—2,233 Hz  
18—The higher the Q, the narrower the BW.  
19—F. As f increases R increases due to skin effect.  
20—The time L or C requires to charge to 63.2% of its maximum charge.  
21— $TC = RC = 200 \times 10^3 \times 2 \times 10^{-6} = 0.4$  sec.  
22—5  
23—T  
24— $T = L/R = 2 \times 10^{-3}/50 \times 10^3 = 0.04$  sec.  
25—F. The TC will not affect the output waveshape but a short TC will reduce the output amplitude.  
26—T. See Fig. 5.30(B)  
27—T

### Corrections

March, 1977 Part 13—The correct answer to Q21 is  $30 \times 0.688 = 20.7V$ .  
April, 1977 Part 14—The drawings for Fig. 5 and Fig. 6 in Experiment #16 are interchanged.

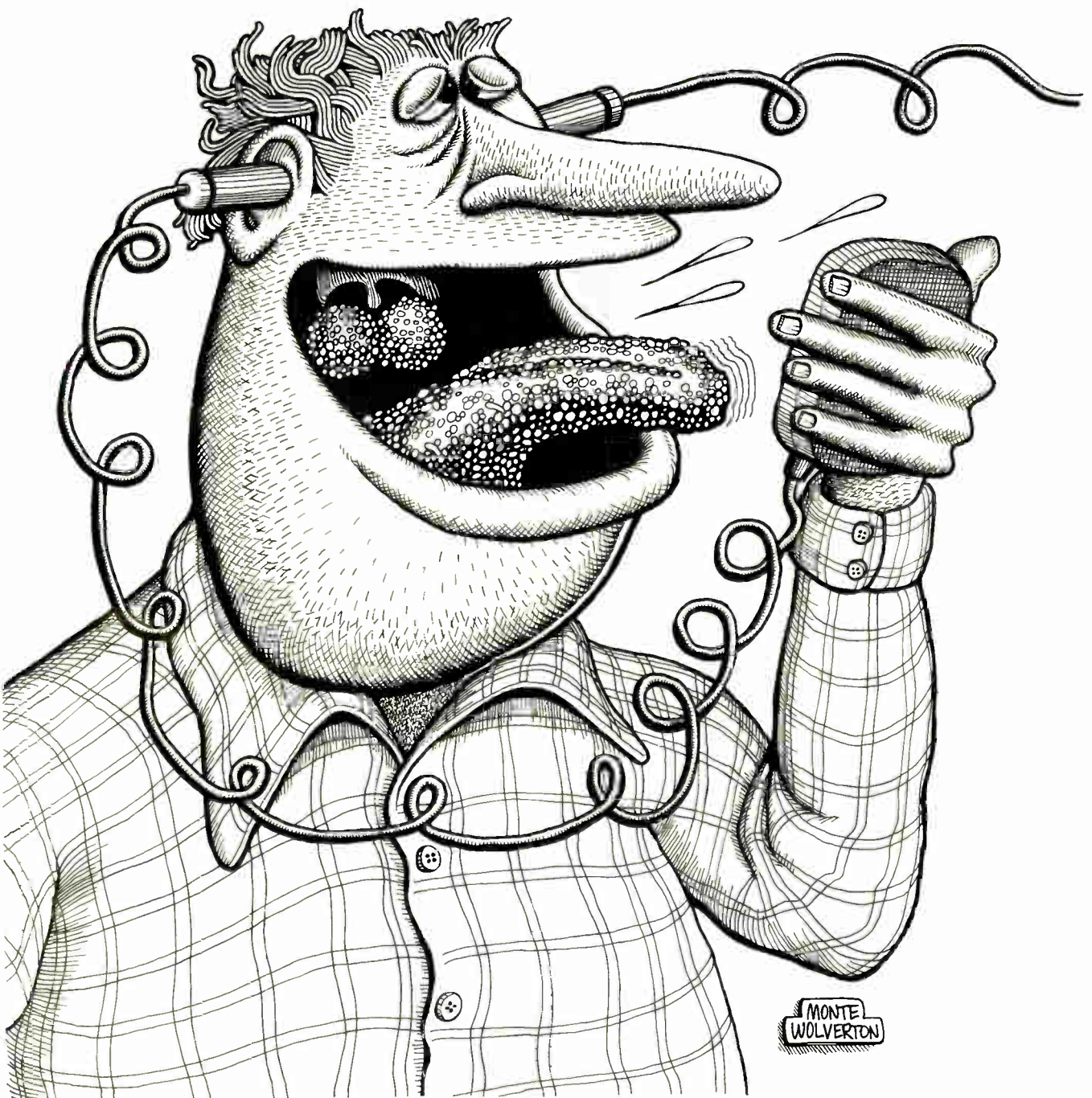


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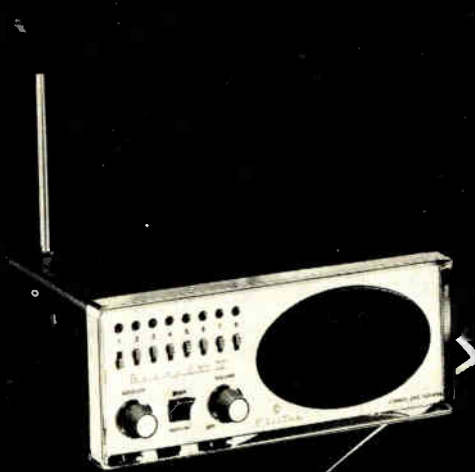
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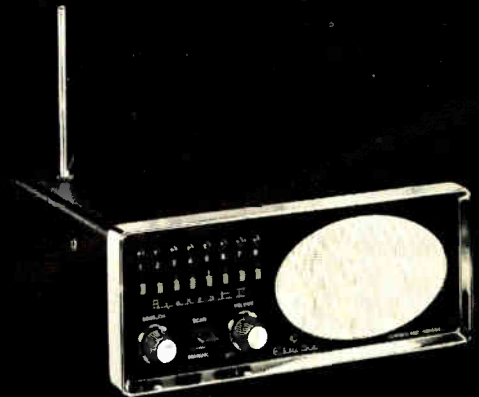
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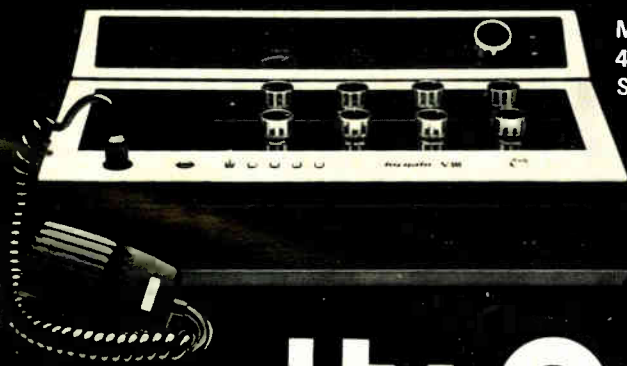


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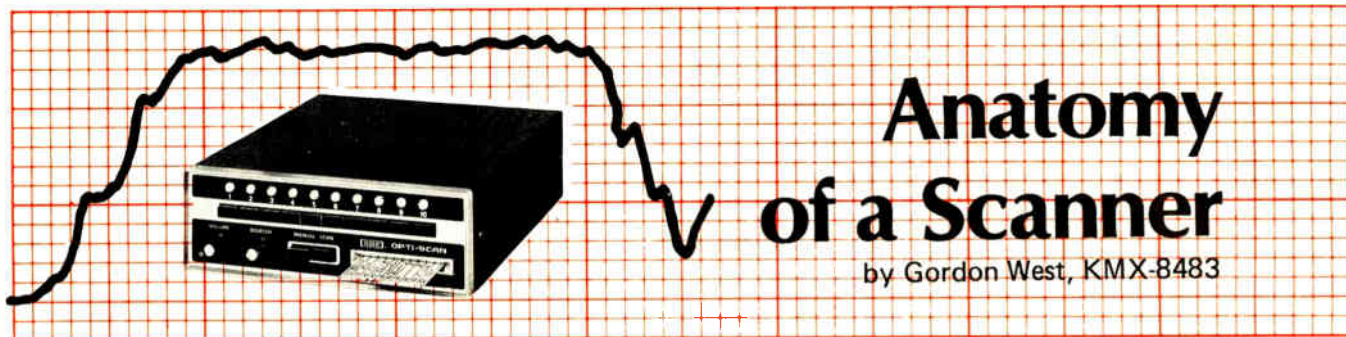


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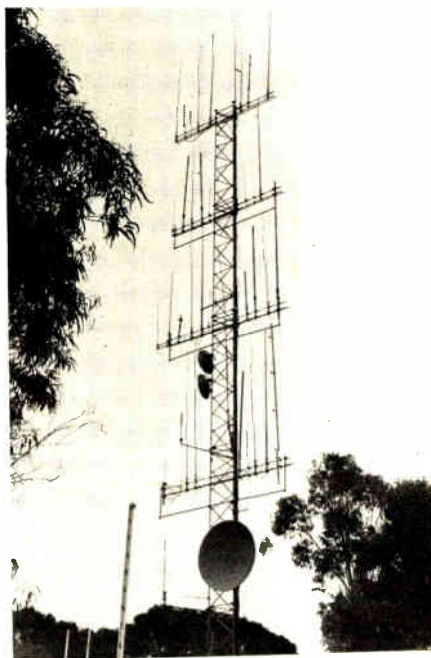
## PART 8 : THE UHF BAND - WHERE THE ACTION IS

**T**en years ago, the UHF band was just about considered useless for anything other than ultra-short range communications. Signals on the UHF band would travel in extremely line-of-sight patterns, and two mobile units traveling away from each other could barely communicate beyond five miles. But as the lower frequencies became more crowded, radio users were literally pushed up to the UHF band, and were forced to pioneer a new ultra-high frequency set of channels.

The Federal Communications Commission eased the situation of the ultra-short range nature of communications on the UHF band by allowing repeaters. A repeater is a stationary, unattended transmitter/receiver apparatus that automatically receives and re-transmits signals from a high mountain top or building location. The transmitter and receiver sections are generally separated by 5 MHz's—and signals that access the receiver are automatically re-transmitted by the transmitter section 5 MHz's apart. I'm sure you can see the beauty of this system already—two mobile units might easily be able to communicate up to 80 miles away on the UHF band with their signals automatically being re-transmitted by a repeater station. If the repeater is on, let's say, a 1400 foot hill, chances are the two mobile units could be separated by over a 100 miles and still maintain crystal-clear communications via the automatic repeater station.

The Federal Communications Commission also allows for remote controlled stations in the UHF region. This way a base station's transmitter, receiver, and antenna may be located high atop a mountain for considerable range. The actual control point might be in a valley several miles away connected by phone wires.

There are also advantages to the UHF band—and that is by signal reflection. Since UHF frequencies are generally allocated when all the other



frequencies are tied up—we usually see the UHF service prevalent in metropolitan areas. In these areas, UHF signals tend to reflect off of buildings, cars, and other man-made obstacles, and UHF signals penetrate just about everywhere. It's even possible to transmit down under a garage with complete readability to a station several miles away—your signals being reflected off the walls of the garage out to the receiver station. There are also some problems with the UHF band—and that is some of the “dead spots” that may be encountered. As signals are bouncing back and forth between buildings, sometimes they arrive out of phase with each other and cancel each other completely out. This means that if you park your vehicle in just the wrong “dead spot,” your signal's reception will be minimal. However, by inching your vehicle forward by no more than a foot, the station with whom you are trying to reach will now

come in completely clear. This is a common phenomena on the UHF band.

Because of the ultra-high frequency, ignition noise and man-made noise is at a minimum. Very rarely would you ever encounter “skip” signals from stations hundreds of miles away. Skip on UHF seldom occurs.

During the summer months it is possible for UHF signals to “duct” over hundreds of miles—and this sometimes causes some confusions when there is another user on your precise frequency in another town hundreds of miles away. This “ducting” is caused by temperature inversions, and the UHF line-of-sight signals are actually tunneled back and forth between the cool and warm air masses—and your signal will arrive hundreds of miles away.

To spot a UHF user, look for either two types of antennas: the more common antenna is a 5 db gain antenna with a gray loading coil in the center—the whole antenna shorter than two feet long. It is generally mounted on the cab of a vehicle. Some users who only require short range communications on UHF will use a tiny “spike” on the center of their roof—and this is only a few inches long. That center loaded 5 db gain antenna is much more efficient, and is much more prevalent on UHF frequencies. It's an easy one to spot—a dead giveaway for a user on the UHF frequencies.

Let's now take a look and see where some of the excitement is on the UHF channels.

450.050 to 451 MHz is allocated to the remote broadcast pick-up service. This is where you'll hear a lot of radio stations and mobile units talking to these radio stations giving them the up-to-date traffic conditions throughout the metropolitan area. It's easy to hear the mobile units on the 450.000 MHz frequencies because they are automatically being re-transmitted—the mobile units are actually coming in to the repeater at around 455 MHz. All you

need to do is tune into the lower side of the 5 MHz repeater split, and you will hear the automatic re-transmitted mobile unit loud and clear from the base station's high antenna transmitting facility. A good way to stay up to date on traffic reports would be to listen in on these frequencies.

451 to 452 MHz are a group of channels allocated to the industrial radio service. Probably not too much excitement here—there are a lot of water and power users operating on these frequencies.

452.050 to 452.950 MHz are allocated to vehicular type stations involved in the transportation of materials, automotive emergency and tow trucks, and also a few for taxi and railroads. Again, don't expect too much excitement here unless you're interested as to what your local automobile club is doing for excitement.

453.025 to 453.975 MHz is a good area to scan in that there are a lot of channels used by your local government, police departments, and fire departments. The channels are squashed in here every 25 kHz apart, so you'll have to do some careful tuning in as to where the excitement is. But put a big red star beside these frequencies—they should provide some interesting listening when there might be local crimes or a fire occurring in your area.

454 to 455 MHz is packed with radio common carriers and Bell telephone service operators. Here you'll tune in to all those juicy mobile telephone conversations—and this group of frequencies should provide you with a great deal of enjoyment as to hearing who is talking to whom, all this going on as someone is traveling down the highway in their vehicle. If you're interested in eavesdropping on mobile phone con-



versations—this is the one MHz area to take a tune in to. Remember, it is illegal to divulge anything that you might eavesdrop in on—you've got to keep it secret, no matter what you hear on the mobile telephone frequencies. You'll find just about every conversation imaginable between 454 and 455 MHz.

With the mobile units transmitting 5 MHz up from the frequencies I just listed, there is a gap between 455 and 460 MHz. In that gap you might be able to detect a mobile unit now and then—but the range of these mobile units to your monitor scanner will be extremely short. The best bet is not to try and tune in the actual mobile unit, but listen down 5 MHz to the base station and hear both sides of the conversation as it's automatically being re-transmitted. Save your time, and don't expect much between 455 and 460 MHz.

460 to 460.625 MHz are rich in police and fire monitoring. Here the FCC has assigned the police and fire department exclusive use of frequencies every 25 kHz apart—and get your scanner cranked up on these frequencies for some exciting calls!

460.650 to 460.875 MHz are a group of frequencies allocated to the business radio service for the express purposes of airlines to contact their home stations to transmit data regarding their flight. It's very seldom that you will hear the aeronautical fellows on these FM frequencies, but none the less, take a tune in to these ten channels, and you'll be able to hear an airline talking about its route, head winds, weight, and how many dinners they're going to need when they arrive in the next city!

461 to 462.450 MHz are a host of channels allocated primarily for the business radio service, the manufacturing radio service, and a few other business type users. From funeral parlors to the local florist delivery service—you'll hear it all on this group of frequencies. Some might be exciting to listen to—and probably the remainder will be quite dull. The business radio users have these group of frequencies, and you'll be able to hear just about anything that's going on if it relates to a person's business on these channels.

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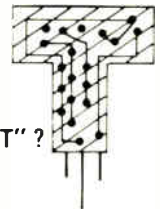
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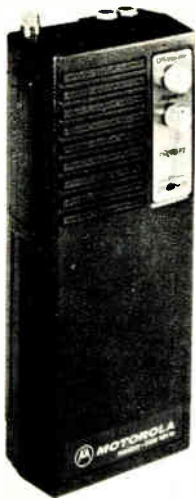
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462.750 to 462.975 MHz is allocated to the business radio service one-way paging service. You'll hear nothing but a lot of tones—more two tones and a series of beeps and beeps with a message here and there—but it will be downright boring unless you are interested in the paging business radio service.

Paramedic channels—463 to 463.175 MHz—these are the repeater stations that automatically re-transmit the paramedic mobile units 5 MHz up frequency. Just recently these frequencies have been allocated solely for the purpose of paramedic mobile intensive care units to transmit a patient's vital signs back to paramedic base station hospitals. On these channels you'll find every bit of drama that you might see on television on the famous "Emergency" show. Because base stations hospitals use large antennas, you should have no problem at all picking up the automatic re-transmitted signals of the paramedic intensive care vans as they are speeding to or from the scene of a major accident. You'll also hear a patient's heart beat being transmitted on these channels—and after listening in on the eight paramedic telemetry and voice channels, you should be able to easily distinguish the sounds of a person's normal heart beat—or a person who is



undergoing a severe heart attack. There are probably no other frequencies in the UHF band that will yield quite the excitement that the paramedic channels will. Here is a list of the actual frequencies and channel assignments for each frequency. These are the base station channels that will automatically re-transmit the mobile unit 5 MHz up. You should need a very small antenna set up to pick up these emergency paramedic channels:

Frequency 1 — 463.000 MHz, Frequency 2 — 463.025 MHz, Frequency 3 — 463.050 MHz, Frequency 4 — 463.075 MHz, Frequency 5 — 463.100 MHz, Frequency 6 — 463.125 MHz, Frequency 7 — 463.150 MHz, Frequency 8 — 463.175 MHz.

There are two additional channels that are sometimes used by base station coordination centers to tell the paramedics which channel to transmit on to a certain hospital. These "coordination" channels are allocated as follows:

Frequency 9 — 460.525 MHz, Frequency 10 — 460.550 MHz.

If it's excitement and real life drama, tune in to these paramedic channels, and you'll hear action like you've never heard before.

463.200 to 465 MHz are another host of frequencies allocated to the general business radio service—you'll hear more dull business radio calls on these many channels.

Again we have another gap in the frequency coverage in that the mobile units to the just listed frequencies above will be transmitting 5 MHz away—on those frequencies where we have the gap.

Beginning at 470 MHz, we find that the mobile units transmit only 3 MHz apart from the base station frequency, rather than 5 MHz apart as they did from 450 MHz to 470 MHz. As before, the base station re-transmits the mobile units automatically on the lower side of the 3 MHz split. It's that automatic base station—repeater station—that you will want to tune in to for easy reception of their companion mobile units.

Also on the frequencies from 470 MHz up, you will find that they gen-

other citizens band radio service out there, and this one's called "Class A" CB. What you'll hear on these channels—plus the mobile channels 5 MHz up—is a type of CB much more regulated and oriented to the business radio user. We'll talk about Class A CB in depth next month in *S9 Magazine*—so if you're interested in getting away from a lot of the "skip talkers" on Class D citizens band, and want crystal-clear FM communications, and even a repeater station, you'll learn more about Class A CB next month.

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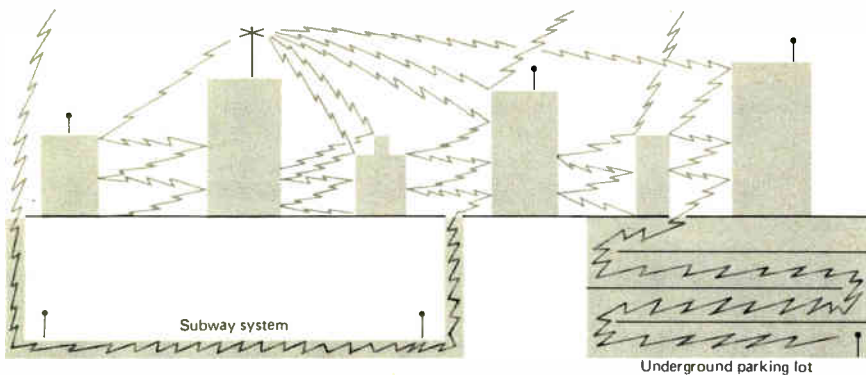
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NOTE:  
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erally will end with an odd number, such as 470.3125. Some programmable scanner monitors do not have the provision for picking up that last digit. In order for you to properly receive the frequency 470.3125 on a programmable scanner, you should program it to the next highest frequency, or the next lowest frequency, and see which one sounds best. In other words, to pick up the frequency 470.3125 MHz, set your programmable scanner to 470.312 MHz or 470.313 MHz. Choose the frequency that sounds the best for this "split channel" desired frequency.

470.3125 to 471.1375 MHz are allocated to the police and fire radio service—so you should hear a lot of excitement on these frequencies.

From 471.1625 to 472.9875 MHz are another group of uninteresting channels allocated to the business radio service, and the vehicular mobile radio service. Save your ears—you probably won't hear much action here.

476.3125 to 477.1375 MHz are again allocated to the police and fire radio service—and you should be able to hear some exciting calls.

The frequencies beyond 477 MHz are only allocated in special areas where all other frequencies below that channel are completely used up. Those frequencies between 477 and 512 MHz are shared with the television broadcasting service—and only in selected cities will there be business, police, and fire radio users on those channels. The best bet is to check with your local scanner shop and see as to whether or not there is operation by these services on the "T" band.

Some scanner monitors are not cap-

able of tuning beyond 475 MHz—check the specifications before you try to purchase crystals for those scanners. Some scanners that utilize crystals do take in frequencies up to 512 MHz, but the crystals for the extended coverage "T" band must be of a special cut.

Some programmable scanners have to be ordered special for the "T" band, so make sure that you order the proper scanner with the proper frequencies by noting as to whether or not the "T" band is used in your area.

The following cities, under an FCC proposal, will be assigned frequencies between 470 MHz and 512 MHz from a "general access pool" of frequencies. Those cities that may be utilizing these frequencies are: Boston, Chicago, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Washington, D.C.

There are other cities also using the "T" band, but in unspecified areas. Once again, check your local scanner outlet for "T" band frequency assignments. You'll find that your UHF scanner antenna will work well on the "T" band. There is no way to easily identify by a user's antenna his operation on "T" band frequencies.

900 MHz — you've heard a lot about 900 MHz, and believe it or not, there are some police and fire departments that have switched and added 900 MHz to their radio set up. To date, there are no inexpensive scanner receivers for 900 MHz, so there's no real sense in outlining any frequency allocations in this region. However, probably by five years from now, 900 MHz will be just as common as 450 MHz is today!

Next month we'll take a look at the UHF Class A citizens band, and some of the exciting operation that is available to you by a simple FCC application and the use of inexpensive Class A UHF-FM CB equipment. Until then, good monitoring of those UHF channels, and I think you'll find those paramedic channels the very best to monitor out of them all for excitement!

# HEY! Getcha Giant Skipland Map Poster!

The **CB Skipland Map** in our November issue has been souped-up and reprinted by popular demand! We made a more detailed (lots more things—including most major cities with their CB handles) huge size version (17 by 23 inches) on high quality, colored stock—just right for the wall of your CB shack! It's sort of a limited edition, so now's the time to move if you want one! Here's how to get your own highly detailed version: fill in the coupon below, enclose only **\$1.75** (includes postage and mailing) and send it back to us! This map will really blow smoke with everybody who sees it!

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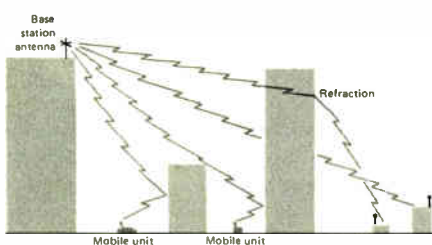
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# The Cancer CB Personality

JUNE 22-JULY 22

by Paperdoll—KMI4549

**S**UMMERTIME and the living is easy is the theme song for Cancers who find this the best time of year for rolling down the super slab. Just listen to that Cancer convoy flapping it to their favorite waterhole. These tall, fat, water sign folk just can't wait to get their feet wet. Tune in on marine channel 14 to hear their super signal carry over the waterways from the boats they're in. Patriotic citizens, too, they are, waving their flags from their homes, boats and CB antennae. Willy scals, these lunar ruled earth people—constantly changing moods with the tides. Now you hear them, then you don't. Sensitive Cancerians turn up their squelch on any kind of unpleasant modulation of life's situations and retract to the safety of their shells. Their sensitivity also applies to their mental receptivity, which is extremely high most of the time. They know what you're thinking before you say it. Home base is where they usually emanate from. Cancer YL's shout you 10-13's and 10-5's in between their domestic chores. Often hear a couple rug rats in the background. Buffalos stay close to home 20 too within earshot of their super speakers as they putter round the house and yard. Cancerians are so attached to their homes (makeshift shells) that they often pull them with them down the road—shanty shakers, campers, vans. Typical Cancer handles might be: Misty, Daffy Duck, Moondoggie, Water Rat, Olive Oil.



## JULY STAR CHECK

**CANCER**—Pull out the power pack July 1st so you cooped up Cancers can get out—at least verbally—as stormy weather dampens plans. Sun shines through on 16th, 17th, 22nd and 30th as planetary aspects send out your signal wall to wall and unexpected good things begin to happen. Psychic perception peaks this month. Be conscious of your hunches and follow them.

**LEO**—Exposé! July 1st full moon could reveal secrets or confidences about you that would definitely make you blush. Certainly no time to confide anything more to anyone. Changes that have been in process in your life over the past year are now beginning to materialize. New home 20, maybe? End of July brings out the lion in you. You get much attention and are placed on a pedestal by a new good buddy.

**VIRGO**—Full moon 1st cautions you not to try any tongue twisters especially on the frequency. Some flaky lunny out there might cause you to lose your cool and possibly a good buddy. Otherwise, July's one fine month to score at work 20 and make that easy living promotion, 10-4. July 30th is THE day to impress.

**LIBRA**—Mid-summer vacation time brings you and loved one together for super fun abroad on fast paced tour of historic cities. Catch you on the bounce-around. Don't let enthusiasm for your travels put you in dreamland while at work 20, or beginning of July could cause altercation with superiors. Old friends are seen or heard from July 20 and 22nd.

**SCORPIO**—July 16th begins new lifestyles for usually stable, unswerving Scorpios. Definitely personality changes too—for the better, uh-huh. Scorpio buffalos have added machismo this month while the Scorpio YL's are equally attractive. Keep the channels open for a convoy of chasers. Extra work piles up at work 20. New responsibilities may follow on the 20th there.

**SAGITTARIUS**—Joint funds which are depleted July 1st may cause friction between you and partner or better half. Be a terrible day for opening new accounts also. Wait till after the 16th for those greenstamp transactions when all details are clear. Loved ones keep you busy and in close touch from Mid-July on. July 30th is extra special day and contributes much happiness. Philosophic evaluation on the 20th should spirit you to jot down those worthy thoughts.

**CAPRICORN**—Uh-oh! July 1st full moon creates erratic behavior that definitely upsets you and better half or business partner. Diplomatic silence is a must. Good buddies at work 20 are really at your service now. Your superiority and integrity are finally realized. End of July brings that bodacious recognition, fer sure.

**AQUARIUS**—Hammer down on that Aquarian fortitude as winds of change at work 20 have you coming and going all month. Love life can't get any better for you as three marvelously super planets group together to bring you your heart's desires. The 30th will be a particularly happy day—maybe the day you decide which one to make better half.

**PISCES**—Don't rock the boat with loved one on the 1st—a full moon night. The 19th could also be a day to keep your starry eyes wide open. Home 20 is where the action is this month as you call an impromptu eyeball and do some exciting entertaining. You finally get to see some of those faces of the interesting voices you've modulated with for a long time. Great days for that coffeebreak would be the 17th, 22nd or 30th.

**ARIES**—Keep your ears on this month, Aries, for some interesting marathon modulating. Get that antennae all the way up there so you don't miss a thing. You're a CB star this month. Great ratchet-jaw days are the 6th, 15th, 17th, 20th, 24th and 30th. Good time to go 40-channel, too. You'll have one for each channel, don't you know?

**TAURUS**—A close relative really gets the best of you July 1st. You can completely lose your power of concentration unless you squelch them out. Fix up the home 20 before the 20th when you'll be entertaining an old good buddy. Be a fine month, too, for making those greenstamp transactions. You'll have a hard time stuffing them in your piggybank, fer sure. Don't miss those opportunity days—17th, 22nd and 30th.

**GEMINI**—With the exception of the 1st when you may lose some greenstamps or unwisely spend them, July is a super month for taking advantage of one of many opportunities presented you for the future. The 22nd and 30th are the best days to accept or act upon that offer. You'll be ratchet-jawing with old friends all month. Older kinfolk come to visit on the 20th.

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7-77



# Bill Orr on Antennas

## PART 17: TELEVISION INTERFERENCE

**C**LOSELY connected with the subject of antennas is the subject of *television interference* (TVI). Television interference is simple: if you don't have it, it's no problem. If you do have it, it's hell. There's no in-between!

A lot of heated words have been written on the subject of TVI, and the Federal Communications Commission (FCC) is flooded with complaints from TV viewers that their reception is being messed up—and most of these complaints are directed against CBers. There's not much the FCC can do about TVI. The ultimate solution rests between the *interferer* and the *interferee*!

Unfortunately for both the CBer and the TV-viewer, the solution to TVI is complex and requires the cooperation of both parties. Why? Simply because TVI can be the fault of the CBer, or it can be because of deficiencies in the television receiver, or both, or it can be due to external causes having nothing to do with either the CBer or the viewer! And it's not easy to separate this can of worms. Ultimately, the buck passes to the CBer—guilty or not—he's the culprit.

### Let's start with the CB Equipment

Most CBers know something about *harmonics*. If you do not, here's a quick run-down. Radio transmitters of all types emit harmonics, which are unwanted signals that are multiples of the transmitting frequency. For example, if you are transmitting on a CB channel (let's say channel 1, which is 26.960 MHz) your transmitter will have harmonic signals at twice, three times, four times, five times, etc. the transmitting frequency. The harmonic frequencies are: 53.92 MHz, 80.88 MHz, 107.84 MHz, 134.80 MHz and so on. Higher harmonics extend up into the 200 MHz region, but they grow progressively weaker and hopefully don't cause any trouble.

However, the harmonics I have listed are really trouble makers. The second harmonic (53.92 MHz) falls very close to television channel 2, the third harmonic (80.88 MHz) falls on top of TV channel 5, the fourth harmonic (107.84 MHz) falls in the FM-stereo band and the fifth harmonic (134.80 MHz) falls in the aeronautical radio band. Thus, with your CB set

you could possibly interfere with two television channels, FM reception and aviation radio all at the same time!

As you move from channel to channel, the harmonics move with you, but the results are generally the same. Luckily *most* CB sets are pretty "clean", the harmonics are generally quite weak, and *under normal conditions* would cause no trouble. There are situations, however, where TVI can be a problem.

### How to Cause TVI—The Easy Way

Do you want to cause television interference the easy way? You can be the scourge of the neighborhood and have all your neighbors hate you. How? Very simple. Just add a linear amplifier to your CB set. The linear amplifier, in this case, is an illegal device that boosts your transmitter power beyond the legal limit. "Guaranteed" to make your signal louder, these infamous devices are sold by the hundreds of thousands to gullible CBers who believe what they hear or read, without knowing the full story of the illegal amplifier.

A friend of the author of this column who is a widely-respected communications engineer and who has designed untold amounts of CB equipment has said flatly, "I've seen hundreds of CB linear amplifiers and they are *junk!* Sold by quick-buck artists, they are poorly made, full of distortion and loaded with powerful harmonics. A savvy CB operator can usually tell when another station is using a linear because his signal sounds so lousy. It 'bleeds over' the adjacent channels and the modulation sounds flat, or distorted.

"Since the amplifier is illegal to begin with, the manufacturer makes it as cheap as he can so he doesn't have too much money tied up in case he is caught. And worst of all, these fly-by-night operators haven't the faintest concept of amplifier design. They copy some other guy's design—including all the faults—or often just build up something out of the discards left over from the industry—you know, rejected parts and all that jazz".

A case in point was a CB amplifier recently checked by the author. This illegal box was supposed to "make you ten times stronger!" according to the salesman of



the device. When measured in the laboratory, it boosted the CB signal by a factor of six (not ten), *but it boosted the harmonic signals from twenty to two hundred times stronger than the original signals of the CB set!!*

Good Grief! This means that a really "clean" CB set having a minimum of harmonics, when operated into a cheap linear amplifier, will have the harmonic energy boosted to a level that will *wipe out* TV reception for receivers tuned to TV channels 2 and 5 in the immediate vicinity and possibly cause interference to TV sets as much as a mile away! And—in a metropolitan area—that includes thousands of receivers!

*The only conclusion is that a CBer using illegal linear amplifier is really asking for it, as far as television interference goes. And that applies to base station amplifiers as well as mobile amplifiers, too!*

### Harmonic Suppression

It is asking too much to clean up the harmonics generated by a poorly designed linear amplifier, but it is possible to greatly reduce the harmonic output of your CB set. It doesn't take very much harmonic signal to override a TV picture and even a weak harmonic signal can cause a cross-hatch or herring-bone *interference pattern* to appear on the TV screen, which is most annoying to the viewer. In some cases, in addition to the visual interference, the CB transmitter may cause *sound bars* on the received picture which result from voice modulation of the CB transmitter. These are horizontal black bars on the screen which vary with modulation.

It is impractical to build a CB set that does not have *any* harmonics, but the FCC has established that if the harmonics are a certain power ratio lower than the fundamental signal, the CB set is considered to meet good engineering standards. The majority of modern CB sets meet this specification. Even so, if the TV signal is weak, or because of other external circumstances, a "clean" CB transmitter can cause TVI.

Additional harmonic suppression may be achieved by the addition of a *harmonic filter* (sometimes called a *low-pass filter*) between the CB set and the transmitting antenna. This filter prevents the CB harmonics from being radiated by the antenna. Experience has shown that in the majority of instances, the use of a good harmonic filter will suppress or eliminate television interference caused by harmonic radiation. Low-pass filters suitable for CB service are available from a number of sources. (The unit is called a "low-pass" filter because it *passes* the lower CB frequencies but *stops* the higher harmonic frequencies).

Shown in Figure 1 is a pictorial representation of a simple and effective low-pass TVI filter suitable for use with any CB rig. It is designed to suppress harmonic energy generated by your transmitter that might reach your CB antenna and be radiated to a nearby television set or stereo receiver. Specifically, the filter

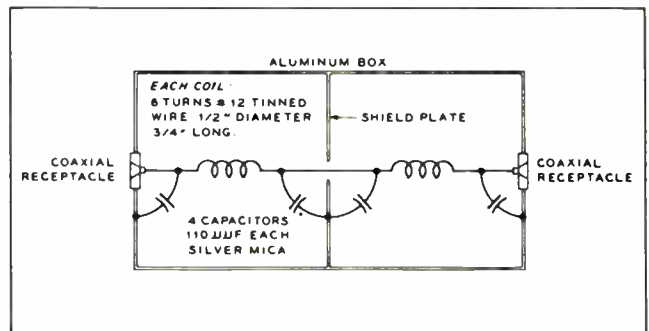


Fig. 1—A TVI filter for your CB transmitter. This device prevents the TVI-producing harmonics in your set from reaching the antenna. The filter can be built in an aluminum "mini-box" measuring 4" x 2" x 2 3/4". Place a shield plate across the inside having a 1/2" hole in the center. Bolt the shield in position with 4-40 hardware. The coils are self-supporting and are soldered directly to the center terminals of the coaxial receptacles. Wrap insulation around the wire that passes through the shield hole to prevent a short circuit. Bolt the box together securely with self-tapping screws. (Drawing from "The Truth About CB Antennas", published by Radio Publications, Box 149, Wilton, CT 06897. Price, \$5.95 plus 35¢ postage and handling.

reduces the harmonic energy output of the transmitter by a factor of about 1000. The filter is built in a small aluminum box and fitted with two coaxial receptacles which match the coaxial fittings on your transmission line. Either end of the filter may be taken as input or output, as the unit is electrically symmetrical.

The filter unit is composed of two filter circuits, each in a separate compartment, connected together by a single wire that passes through an insulated hole in the shield plate. The four capacitors shown are readily available units, and the small coils may be hand-wound out of tinned copper wire. The illustration shows the placement of parts in the box. All leads are short as practical and properly soldered. The box lid, or cover, should be held firmly in place by means of sheet metal screws to prevent the harmonic energy from leaking out along the seams.

You can build a filter of this type for your transmitter, but it is possible to buy an equivalent unit for little more than the cost of the parts. Either way, the low-pass filter will materially aid you if you have TVI problems.

### Using the TVI Filter

The filter is placed in the coaxial line running from your CB equipment to your antenna. It will work equally well with mobile or base stations. Normally, the filter is located near the equipment, rather than being placed near the antenna. Use coaxial connectors at all joints in the line, as shown in Figure 2 so that r-f energy cannot "leak" around the filter. If you want to include an SWR meter in your antenna circuit, *place it between the filter and your equipment* rather than after the filter.

### The Line Filter

Once you have prevented the harmonics of the transmitter from going up the coax line and being radiated from the antenna, the pesky harmonics will

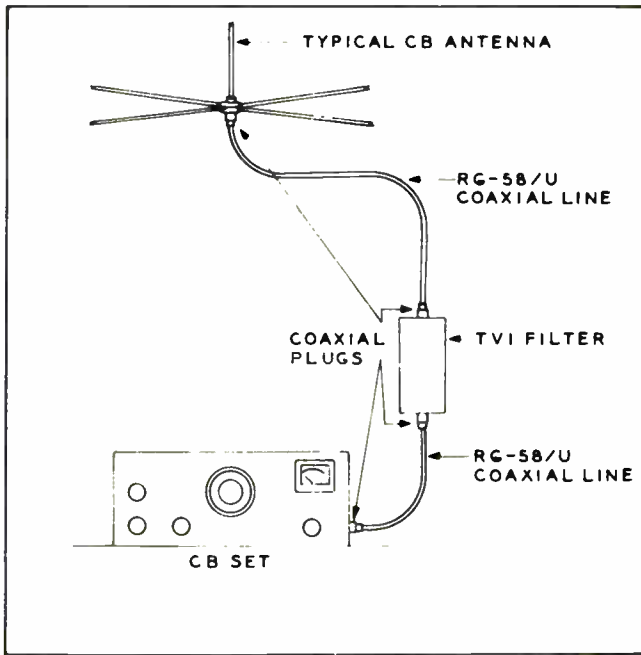


Fig. 2—The TVI filter is placed in series with the coaxial line between the antenna and the CB equipment. Coaxial plugs are used to make connection to the filter. If an SWR meter is used, it should be placed in the line between the filter and the CB set. (Drawing courtesy Radio Publications, Inc.).

have a simple internal filter placed on the power line, but it may not be very effective as far as eliminating harmonics is concerned. You can buy a device called a *line filter* that is placed in the a-c line to the base station that will prevent harmonics from travelling down the power line and into a nearby TV receiver. One such filter is the *Miller 7818 All-Wave Interference Filter* manufactured by the J. W. Miller Co., 19070 Reyes Ave., Box 5825, Compton, CA 90224. Other manufacturers make an equivalent filter, too.

The filter has an extension cord on one end to plug into a nearby electrical outlet and a receptacle on the other end into which you plug your CB set. It is a good idea to cut and trim the a-c line on your CB set so that the length of line between set and filter is as short as possible. You'll also notice the filter has a ground connection on it. Connect this to the chassis ground point of your CB set with a *short* wire. Ideally, the filter should be tucked behind the CB set, with a very short line cord between the filter and the set.

try and escape by another route. The next easiest path for them is down the power cable. Most CB rigs

**Checking Everything Out**

Once you have a line filter and a low-pass filter on your CB set you should be in pretty good shape as far as TVI goes. You can check things out with your own TV set. Do you have any interference, particularly on the low TV channels? You might find now that the transmitter harmonics are present in the microphone



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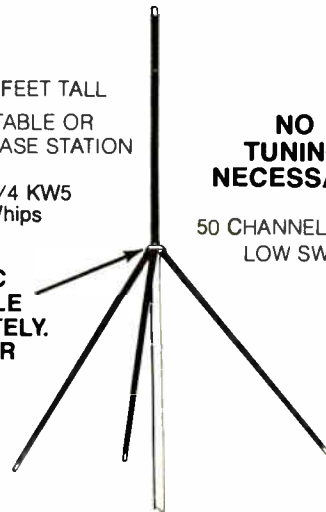
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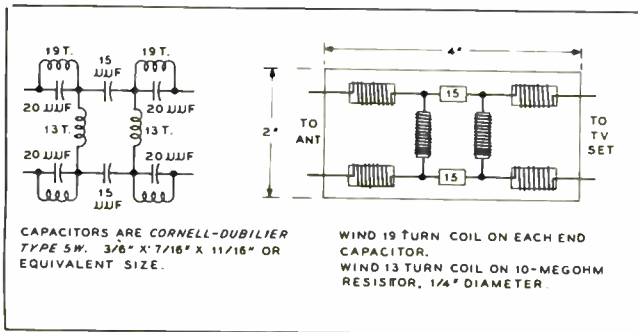
cord (!) and by merely moving the cord about, the television interference increases or decreases. Don't laugh! One of the FCC tests on new CB equipment is to check harmonic radiation from the microphone cord when it is fully extended! So this item can be a source of trouble. If you find you have a "hot" mike cord, you'll have to find a reliable technician in a service shop who can install a suitable filter inside the CB set right at the mike jack.

Once you have taken these steps, your equipment should be comparatively free of harmonic radiation, except for the small amount that leaks out of the transmitter cabinet. This leakage usually does not travel any great distance and should cause no problem unless you live in a super-fringe area of TV reception.

One last word of caution. Beware of placing your SWR meter *after* the low-pass filter in your coax line. The SWR meter has two small diodes in it that can generate harmonic signals on their own when you are transmitting! Thus your rig can be "clean" of TVI, but the darn SWR meter can generate trouble-causing harmonics that are otherwise not present in your equipment. So a low-pass filter is a good adjunct to your equipment if you leave an SWR meter permanently connected in your coax line.

**And What About the TV Set?**

Even though you use a low-pass filter and a line filter on your CB set it is still possible for the 11-meter signal from the CB transmitter to reach and overload a nearby television receiver, causing TVI. This comes about because the circuits of the television receiver are not selective enough to reject a strong, nearby signal. It is equivalent to channel "bleedover" in the CB range. Since the TV channels start at 54 MHz and extend upwards in frequency, it may seem absurd to think that a signal on 27 MHz is "close" to the TV channels. However, your CB signal may be as much as 10,000 times as strong as the signal from the TV



**Fig. 3—A filter for the television receiver. Harmonics from your CB transmitter can be stopped before they reach the TV receiver by adding this simple filter in series with the "ribbon line" from the antenna. The filter is built upon a small board made of phenolic or plastic material. The coils are wound directly over the body of the capacitors, with the turns spaced the diameter of the wire. The center coils are close-wound on dowel rod. Mount the filter close to the antenna terminals of the TV set. (Drawing courtesy of Radio Publications, Inc.).**

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**BILL ORR ON ANTENNAS** (continued)

station, and it is asking a lot of some inexpensive TV sets to reject such a strong signal, regardless of its frequency.

Shown in Figure 3 is a representation of a *high-pass* filter that can be placed in series with the 300 ohm ribbon lead from the TV antenna to the set. It should be placed very close to the antenna terminals on the set. (The unit is called a "high-pass" filter because it *passes* the higher frequency TV signals but *stops* the lower frequency CB signals). You can build one from the information in the drawing, but it is easier to buy a manufactured unit enclosed in a metal box.

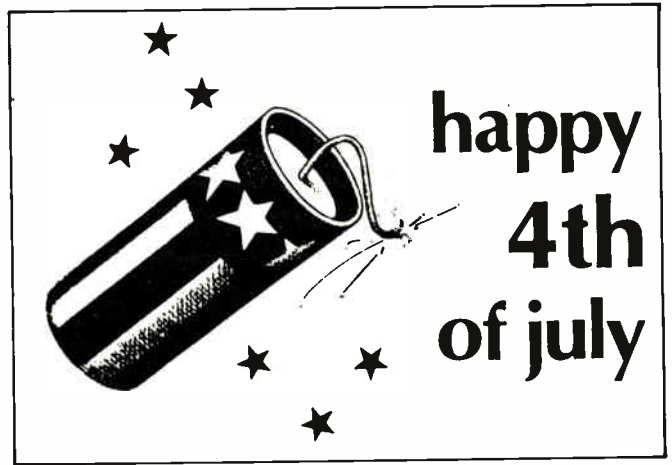
One set of terminals is attached to the ribbon line and the other set of terminals to the TV set antenna connections. If possible, the filter should be mounted inside the set, positioned as close to the TV tuner as you can possibly get so that the leads from the filter to the tuner are short. The next best thing is to place the filter at the antenna connections on the TV set.

If you use filters on your CB set and place a filter on the nearby TV receiver you have gone a long way towards curing your TVI problems. Other obscure causes can sometimes result in television interference, but they are beyond the scope of this column to cover. But, in the main, the steps outlined in this article should cure all but the most stubborn case of TVI.

A final word: *Beware of the illegal linear amplifiers.* They are (to put it bluntly) junk. Poorly designed and

stoppily thrown together they are really dynamite as far as TVI goes! But if you happen to be a user of one of these trashy devices, never, never, never operate it without a low-pass filter in your antenna line after the amplifier or you are just *asking for trouble!* And place a line filter on the darn thing! If you want to be illegal, that's your business. But it rapidly becomes the business of everybody if you cause TVI with the junker. One of the easiest ways for the FCC to locate an illegal amplifier is to check television interference complaints!

As I said before, if you don't have TVI, is no problem. If you do have it, its hell. Better believe me!



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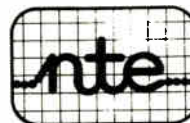
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# WASHINGTON OUTLOOK

## PHOENIX, ARIZ. CASE SET ASIDE

The Commission has granted in part its Safety and Special Radio Services Bureau application for review of a June 3, 1975, Review Board decision, and set aside that decision which dismissed a show cause-cease and desist order against Frank H. Yemm of Phoenix, Ariz.

On March 8, 1974, the Commission revoked Yemm's license for Citizens radio station KEU-1650, effective April 12, 1974, because of his repeated failure to respond to FCC correspondence concerning alleged violations of the Citizens radio rules.

On April 9, 1974, three days prior to the effective date of the license revocation, the Safety and Special Radio Services Bureau issued an order to show cause why Yemm should not be ordered to cease and desist from future violations. This order reiterated the allegations in the revocation order and charged that Yemm's past conduct and his stated intention to ignore Commission correspondence and FCC rules and procedures made it clear that he "will continue to operate his radio station in violation of Section 301 of the Communications Act . . . even if his license is revoked."

Following a hearing on the show cause-cease and desist order, FCC Administrative Law Judge Ernest Nash, in an initial decision released February 5, 1975, dismissed that order, finding that no charges had been alleged other than those in the revocation order and that an order to cease and desist therefore would be "superfluous."

In its June 3, 1975, decision, the Review Board reached the same result on the grounds that the Bureau's show cause order was devoid of either a concrete factual setting of unlicensed or illegal operation or an imminent one and that these deficiencies constituted fatal flaws in the Bureau's order requiring its dismissal.

In seeking review, the Bureau contended that a presiding judge lacked

the authority to dismiss a show cause order merely because he believed it should not have been issued and that the case could be decided only on the evidence presented at hearing.

The Commission agreed that the judge and Review Board had no authority to dismiss the show cause order as defective.

The Commission pointed out that it has invested the various FCC Bureaus with authority in certain areas to initiate hearings. The authority to issue show cause-cease and desist orders in Citizens radio cases, the Commission said, was delegated to the Safety and Special Radio Services Bureau because of that Bureau's responsibility for, familiarity with, and day-to-day management of that area of the FCC regulatory domain.

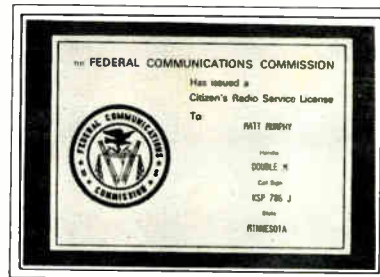
In issuing the show cause-cease and desist order, the Commission said the Bureau was acting in its stead, with the "full panoply of powers and obligations" which the Commission possesses. The FCC said a presiding judge may not dismiss such an order as being defective on its face, nor may the Review Board so act, since such action would defy the statutory structure, for review of delegated authority.

In this regard, the Commission said that consistent with statutory provisions, if either the presiding judge or the Review Board questioned the validity of the order on its face, the question should have been certified to the Commission. Further, it noted that although the Board has delegated authority to review initial decisions, the Commission cannot and has not delegated to the Review Board the authority to review the propriety of the exercise of delegated authority.

Therefore, the Commission held that dismissal of the show cause-cease and desist order as defective on its face was beyond the Review Board's authority as well as beyond the authority of the presiding judge.

The FCC found no public interest would be served by deciding the val-

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idity of the show cause order in this case or evaluating the evidence and therefore dismissed the show cause order as moot and terminated this proceeding.

### LICENSE REVOKED IN MISSION, KAN.

Revocation of the Citizens Band license of Robert L. Langford (KHS-8197) has been proposed in an initial decision by FCC Administrative Law Judge Walter C. Miller.

On April 29, 1976, the Commission directed Langford to show cause why his license should not be revoked for seven different violations of the Commission's rules and for making misrepresentations to the Commission or lacking in candor.

Specifically, the order alleged that on June 25, 1975, KHS-8197 was operated without being identified by its assigned call sign by a person identifying himself as "Toolmaker" in violation of Section 95.95(c) of the rules; failed to observe the five minute period of silence between contacts (Section 95.91(b)); made interstation communication on a frequency reserved for intrastation use (Section 95.41(d)(2)); made communications about signal strength, testing and adjustment or capability of radio equipment (Section 95.83(a)(13)); was used as a hobby or diversion (Section 95.83(a)(1)); and communicated with a station over 150 miles away (Section 95.83(b)).

A prehearing conference and hearing were held on December 14, 1976, and the record was closed the same day.

The judge noted that on June 25, 1975, FCC inspectors monitoring Langford's station heard the violations and on July 24, 1975, the Engineer in Charge (EIC) of the Commission's Kansas City office sent Langford a violation notice with excerpts of the illegal transmissions attached.

Langford did not file a timely response and on August 20, 1975, the EIC sent a warning to Langford.

Around that time, the judge noted, Langford hired an attorney, Conrad Miller, and told Miller his station was not hooked up on June 25 and he could not have violated any FCC regulations.

On September 3, 1973, the EIC received a letter from Miller which had been attested to by Langford stating that Langford's station was dismantled on June 25.

After issuance of the April 29 show cause order, Langford hired new counsel, Frank Covell, the judge said.

On June 2, 1976, Covell informed

the FCC that after discussing the matter with his client it was clear the information in the August 12 letter was incorrect "but not intentionally so."

Judge Miller said that at the December 14 hearing Langford admitted to each of the operating violations and said he had read the violation notice and its attachments. He admitted he was "Toolmaker."

Langford contended he had told Miller the station was not operational on June 25 because he really believed he had not conducted the conversations excerpted in the violation notice. He said his house was being remodeled from November 1974 through the hearing date and during this time the station was sometimes inoperable. He said when he talked to Miller he thought the station was unhooked because he had been out of town on vacation.

Langford said he realized his mistake after he received the show cause order. At that time he went to the EIC's office and was told they had "recordings and triangulations, and so forth." It was then he concluded he had been mistaken about being out of town on June 25.

Judge Miller found Langford guilty of all seven violations and said this alone would warrant revocation of the license.

He said, however, a second, independent reason for revocation was the fact that Langford lied to the Commission in his August 12 letter when he said he could not have committed the violations because his station was dismantled.

Judge Miller said Langford's claim that the August 12 misstatements were inadvertent cannot be credited. He said if Langford really believed he had been on vacation on June 25 he would have conducted some investigation to permit him to verify the fact.

Nor can it be said Langford did not realize the seriousness of the situation, the judge said, since he discussed the violation notice with his attorney and with him, drafted the August 12 response which he knew all along was not a routine communication.

Judge Miller said Langford misrepresented material facts to the Commission when he swore his CB station was dismantled and stored during the June 25 violations.

### AUTOMATIC MORSE CODE ID PROPOSED

The Commission has proposed amending its rules to permit the use of automatic Morse Code identification in the private land mobile services.

It noted that for several years it has received inquiries regarding the permissibility of this in the various private land mobile radio services. (The rules require that station identification be given by voice only.)

Proponents pointed out the use of an automatic device would ensure that the station identification requirements were satisfied and would relieve the control point operator of the burden of either "watching the clock" to make sure the required time interval did not pass or else transmitting the station's call sign more often than is necessary.

In addition, it would be much less expensive than an automatic voice identifier and might result in station identification by licensees who now identify infrequently or not at all.

The Commission said this technique generally has been prohibited because it would require the use of an emission (A2 or F2) not authorized to licensees solely engaged in voice communications and would require the supervision of a licensed radio telegraph operator. In fact, it said, even in the case of nonvoice operations involving the use of A2 or F2 emission, the rules require station identification be given by voice.

In addition to the restraints imposed by the rules, the FCC said its policy against widespread use of automatic Morse Code identification resulted in part from several uncertainties associated with the technical operation of these devices. For example, it said, in a number of demonstrations of automatic Morse Code identification equipment, the identification was transmitted simultaneously with ongoing voice communications and was of insufficient amplitude to be readable even by the most expert observers.

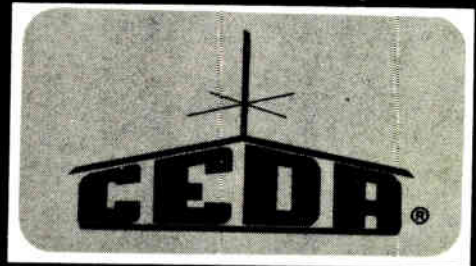
The Commission said it therefore proposed simultaneous transmission of Morse Code identification with voice, provided the level of Morse Code modulation is 40 percent  $\pm$  10 percent and a Morse Code fixed transmission rate of 25 words per minute to allow those unfamiliar with it to tape or transcribe the transmission for delayed interpretation.

It also has under consideration the necessity for frequent transmission of a station's call sign during a series of brief transmissions and the impact this could have in a service using congested channels, such as the CB service.

It noted that it has under consideration Docket 20351 which concerns the implementation of an Automatic Transmitter Identification System (ATIS) for stations in the private land mobile radio service.

(continued)

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## WASHINGTON OUTLOOK (cont'd)

While ATIS is considered the ideal long-term solution to the various station identification problems, the Commission said the implementation of such a system has raised a number of complicated questions which are still being resolved. It said the automatic Morse Code proposal would be an interim measure affording licensees a convenient means of resolving their station identification problems until an acceptable form of ATIS can be developed.

### FCC DOES NOT REGISTER

#### SERIAL NUMBERS OF CB RADIOS

The FCC, in a warning to help curb thefts of CB sets, emphasized that it does **not** register the serial numbers of such sets.

The Commission advised anyone owning a CB set to engrave his or her name, address, or other identification such as call sign on the set. This will enable police to identify the radio if it is stolen and later recovered.

As of January 1, the FCC required all manufacturers of CB radios to place a serial number on the chassis. CBers should copy this number for their records.

The Commission, by its Safety and Special Radio Services Bureau ordered the following licensees to show cause why their licenses should not be revoked for violation of Section 1.89 of the rules by failing to respond to official communications:

- Jacksonville, Fla., Robert J. Myers, KTO-0858.
- Camden, N.J., Antonie F. Duykers, KON-2170.
- Herndon, Va., Glenn Stuart, KXT-3499.
- Miami, Fla., William H. Mathews, KPX-0878.
- Cape May, N.J., Paul W. Jones, KBS-0481.
- Fort Worth, Tex., Don R. Smyth, KEJ-1696.
- Daly City, Calif., Raymond R. Trageser, KLL-7571.
- Watsonville, Calif., Robert J. Mattos, KDA-3498.

### REVOKED

The Commission, by its Safety and Special Radio Services Bureau ordered that the following licenses be revoked for violation of Section 1.89 of the rules by failing to respond to official communications:

- Daly City, Calif., Walle Neller, KYH-1628.
- Milpitas, Calif., Jay M. Preskitt, KHT-5932.
- Redwood City, Calif., Judie L. Pelletier, KXT-8071.

Stockton, Calif., Philip R. Cardoza, KSP-4708.

Torrance, Calif., Donald A. Purkey, KIF-9926.

Waterford, Calif., Richard L. Shepard, KHP-9025.

Jacksonville, Fla., Albert R. Lloyd, KIE-2106.

Sulphur, La., Joe H. Duhon, KIL-4611.

Rockville, Md., Joseph Grover, KYV-1151.

Malden, Mass., Christopher Melanson, KTE-0115.

Denver, Col., Howard M. Thomas, KNS-4829.

Hayward, Calif., B. J. Carpet Service, KEU-8557. Ordered that the license be revoked for willful violation of various sections of Part 95 of the rules including Section 95.83(a)(11) which prohibits the use of sound effects.

Bakersfield, Calif., Albert H. Stillings, KFQ-6653. Ordered that the license be revoked for willful violation of various sections of Part 95 of the rules including Section 95.91(b) which required that a five minute period of silence be observed between radio contacts.

### NOTICES OF APPARENT MONETARY LIABILITY

The Commission, by its Engineer in Charge, on behalf of the Safety and Special Radio Services Bureau, issued Notices of Apparent Liability to Monetary Forfeiture on various dates to the following radio station licensees in the Citizens Radio Service for willful violation of various sections contained in Part 95 or a repeated violation of Section 1.89 of the Commission's Rules:

- Albuquerque, N.M.
- Anthony Martinez, \$50, KXZ-0354.
- Robert M. Scott, \$50, KRS-87110.
- Robert L. Mahan, \$50, KMS-0339.
- Lou McCoy, \$50, KBH-4252.
- Robert C. Garcia, \$50, KRG-87112.

#### Houston, TX.

- Ralph L. Lowe, Jr., \$50, KYG-5174.
- James E. David, \$50, KBR-8838.

Providence Forge, Va., Kenneth N. Roberson, \$50, KPJ-2297.

#### Wythesville, Va.

- James L. Akers, \$50, KHM-2825.
- Charles D. Corbett, \$50, KCB-1772.

Mountlake Terrace, Wash., Delbert R. Harig, \$100, KXN-9438.

#### Ringgold, Ga.

- Ronald D. Adams, \$50, KYV-2662.
- Billie R. Haggard, \$50, KCX-8841.




Rossville, Ga., H & R Refrigeration Service, \$100, KYV-6176.  
 East Ridge, Tenn., Henry M. Campbell, \$150, KBU-2793.  
 Glen Burnie, Md., Donald G. Cole, \$50, KAEV-2437.  
 Tulsa, Okla.  
 George T. Sudar, \$100, KABX-9861.  
 Donald H. Richards, \$100, KFH-6306.  
 Dennis J. McGehee, \$100, KWH-1557.  
 Jerry L. Drake, \$100, KXQ-1607.  
 Willard T. Russell, \$100, KZO-9492.  
 James I. Sutton, \$100, KHD-2566.  
 Pete Chevrier, \$100, KKG-1065.  
 Jerry E. Thompson, Sr., \$100, KOU-8105.  
 Robert L. Bishop, \$100, KMO-1435.  
 Edward L. Payne, \$100, KIJ-6728.  
 John H. White, \$100, KYX-6121.  
 Douglas A. Huffman, \$100, KNN-7624.  
 Delbert L. Brady, \$100, KKW-5373.  
 Garrie, W. Poulter, \$100, KYA-9874.  
 Doy B. Sewell, Jr., \$100, KKP-7658.  
 Douglas Phillips, \$100, KIW-4801.  
 Paul D. Ferlin, \$100, KTS-0488.  
 Eugene Butler, \$100, KGM-3590.  
 Leroy Harrison, \$100, KKW-2609.  
 Darrel J. Richards, \$100, KGB-8062.  
 Charles E. Johnson, \$50, KBU-6274.  
 Jack M. Stegelman, \$50, KZI-6638.  
 James R. Wright, \$50, KWP-9978.  
 George R. Satterfield, \$50, KWU-8828.  
 Elgin, Ill., Dennis J. Schultz, \$50, KYI-3250.  
 Chicago, Ill.  
 Francis H. Mahoney, \$50, KJD-2652.  
 Cedric M. Smith, \$50, KTH-3803.  
 Buffalo, N.Y., Charles G. Alessi, \$50, KEA-1981.  
 Hato Rey, P.R., Edwin Chevere, \$100, KAGV-3947.  
 Tulsa, Okla.  
 Johnie M. Hall, \$50, KID-7782.  
 James Ball, \$50, KZN-5285.  
 Walter M. Kimberlin, \$50, KKT-2821.  
 Dale J. Wright, \$50, KDE-9426.  
 Kermath Boone, \$50, KADV-0701.  
 Martin A. Ryan, \$50, KFF-3797.  
 Louis K. Chalupsky, \$50, KCG-9462.  
 Oklahoma City, Okla., Robert J. Calvery, \$50, KTL-9666.  
 Forestville, Calif., Lawrence J. Carson, \$50, KABM-4030.  
 Petaluma, Calif.  
 Raymond J. McClellan, \$50, KDN-3669.  
 John W. Piehoff, \$50, KADD-5616.

San Diego, Calif., Lewis G. Spady, \$150, KYY-3037.  
 Santa Rosa, Calif.  
 Danny T. Taylor, \$50, KAFG-7301.  
 Donald E. Heid, \$50, KACE-0385.  
 Robert E. Crain, \$50, KAAW-1628.  
 Frank C. Sonnenburg, \$100, KLF-5146.  
 Walter S. Hucke, Jr., \$100, KAAT-8506.  
 East Ridge, Tenn., Gary E. Denam, \$150, KKU-4205.  
 Fort Wainwright, Alaska, James L. Purvis, \$50, KAEZ-7262.  
 Galt, Calif., Delbert R. Renfro, \$100,

KIP-4032.  
 Aberdeen, Md., James O. Swain, \$50, KJS-21001.  
 Adelphi, Md., Russell Earl Pollack, \$50, KKH-8264.  
 Houston, Tex., Israel Walker, \$50, KPD-8981.  
 West Point, Va., Eddie L. Chamberlain, \$50, KMN-2680.  
 Fort Lauderdale, Fla., \$50, KSK-4852.  
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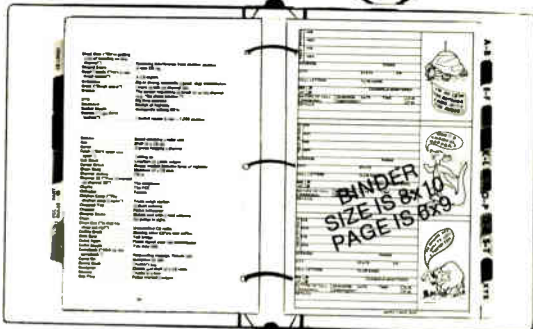
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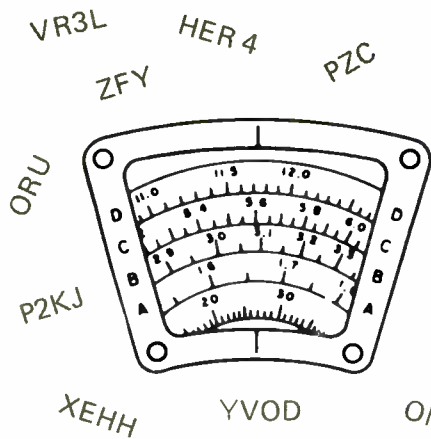
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**F**OR a nation that seems to have so much at stake in telling its story to the world, Israel seems to be missing some great opportunities in shortwave broadcasting.

The potential certainly is there. In the past few years the Israel Broadcasting Authority has invested in a handful of powerful shortwave transmitters—four 300 kilowatts, plus a 100 and a 150 kw. pair.

As many shortwave listeners in North America know from their listening, the IBA's shortwave signals come through loud and clear.

But there just aren't many programs in English. A recent article in the Jerusalem Post laments that Israel "speaks in English on shortwave radio for only 45 minutes a day." Actually, I count somewhat more English shortwave time than that, but not much more . . . and certainly, as the Post points out, IBA has fewer English programs than do such places as Malaysia, Bangladesh and Sri Lanka!

Three years of parliamentary questions, debates on priorities and committee discussions on funding and labor contracts have dragged on. And the powerful transmitters remain silent during the "prime" shortwave listening time in the U.S. and Canada, the early evening hours.

What is the problem? There is disagreement. One contention is that the agency which funds overseas broadcasts is not sufficiently aware of the need for an expanded English language service. English programs get only about eight per cent of the budget.

Union technicians are blamed by others. After 1 a.m., it is said, they demand premium pay. And 1 a.m. in Jerusalem is 6 p.m. E.S.T. in New York, too early for "prime time". An IBA spokesman says it is handicapped by the government wage policy that frowns on paying these premium wages.

The unionized technicians, however, contend they are flexible and that money is not the stumbling block.

But the limited broadcasting time and the less-than-convenient program schedule, IBA gets about a thousand letters a month from English-speaking overseas listeners, according to Sara Manobia, IBA's director of features programming.

News, of course, takes a high priority in the IBA's broadcasting scheme of things. But there is an Israeli hit parade, interviews, technical and industrial reports, listeners letters and more. Introduced, not long ago, was a program to teach simple Hebrew to listeners.

IBA's English programming can be heard, at this writing, at 0500 to 0515 GMT on 7,412.5, 9,815 and 11,960 kHz; from 1200 to 1230 GMT on 11,655, 15,100, 15,485 and 17,815 kHz; from 2000 to 2030 GMT on 7,412.5, 9,815 kHz and from 2230 to 2300 GMT on 7,412.5, 9,435, 9,815 and 11,655 kHz.

As the IBA is well aware, you're probably at work, or asleep normally, during those times. So you will have to make a special effort to tune in the IBA.

If you would like to hear English programs at more convenient times, why not write and provide the IBA with some "ammo" in the way of supportive letters. DX fans, no doubt, will also be requesting QSL cards from the IBA.

You can address your letters to the IBA, Overseas Services, P.O. Box 1082, Jerusalem, Israel. Or, if you prefer, to Israel Radio, Box 204, Cheltenham, PA 19012.

## ABC-DXING

Ever tried to DX your way through the alphabet? There are, of course, a number of different ways you can do it, some harder than others. Here—with a bit of "cheating" with the letters along the way—is one way. Many of these stations won't be too tough to hear. Others may prove to be very challenging even to the more experienced listeners:

A is for Albania—The Radio Tirana schedule, in English, is a half hour on, and half hour off between 0130 and 0400 GMT on 7,300 or 6,200 kHz.

B is for Bulgaria—Radio Sofia is a near neighbor of Albania's and just as easy to log from 0000 to 0100 GMT on 9,705 kHz.

C means Canada—You're perhaps familiar with the international service of Radio Canada International. For a change try the private and commercial Toronto shortwave outlet, CFRX on 6,070 kHz, audible most times, night or day.

D stands for Denmark—Certainly not as easy, but look for an English identification just prior to 1600 GMT on 15,165 kHz. Most programs, though, are in Danish.

E is for Ecuador—What else? Every SWL's friend is HCJB, the Voice of the Andes in Quito. Try 9,560 kHz any evening:

F means Finland—Radio Finland you will find on 15,110 kHz at 1330 or 1430 GMT.

G is for Ghana—The Ghana Broadcasting Corp. uses 3,366 kHz down in the 90 meter band and you can find English from this one at 0600 GMT.

H stands for Hungary—This one, Radio Budapest should give no one any real tuning troubles. Just tune your receiver to 7,215 kHz at either 0200 or 0300 GMT.

I is Indonesia—Here is a fun station. Fun because it is on the exotic side, but not really too hard to hear if you know when and where to tune. The Voice of Indonesia can be found on 11,789 kHz from 1100 to 1200 GMT.

J is for Japan—There are a number of times and frequencies when you can tune in Radio Japan on shortwave. I happen to favor 15,105 kHz at either 2200 or 2300 GMT.

K means Kuwait—Kuwait is one of those oil-rich countries of the Middle East that has invested in some powerful shortwave transmitting gear. You can find Radio Kuwait's programs between 1700 and 2000 GMT on 9,580 or 12,085 kHz.

L stands for Liberia—Here we have the missionary station, ELWA in Monrovia, audible on 11,950 kHz afternoons from 1915 and again from 2015 GMT.

M is for Monaco—There are Trans World Radio outlets on Bonaire in the West Indies, in Swaziland in southern Africa, and, now, on Guam in the Pacific. The original TWR station began in Monaco, however, and can still be heard on 7,110 kHz from about 0730 to 0900 GMT.

N stands for New Zealand—Radio New Zealand is a nightly visitor to the radio shacks of many a night-owl SWL. Try 6.105 kHz any time between about 0700 and 1030 GMT.

O is for Oman—Here, in Radio Oman, we have another voice from the Middle East. The frequency is 11,890 kHz and the schedule includes 0200-0700 GMT and 1100-1300 GMT.

P, what else, Poland—Polish Radio is rather widely heard these days on 7,270 kHz at 0200 GMT.

Q means Qatar—Now this one, Qatar Broadcasting

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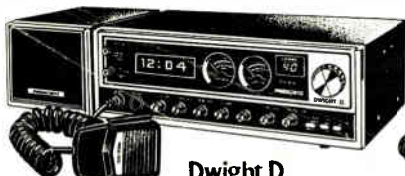
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Service, 9,570 kHz, 1400 GMT, is not an easy catch. But can you think of another Q-country?

R is for Rumania—With Radio Bucharest we're talking about the same frequency, 9,570 kHz, but a different time of day. Listen here at 0130 to 0230 GMT.

S stands for Sierra Leone—Here's a neat little bit of West African DX which you may find putting in a nice signal on 3,316 kHz after 0600 GMT.

T is Taiwan—Here we have the Voice of Free China at Taipei, Taiwan. This one broadcasts in English 2130 to 2230 GMT on 17,720 kHz. Or try 15,270 kHz.

U is for Uganda—And this is a country that has managed to keep itself in the news headlines. Radio Uganda has a daily English language program on 9,730 kHz at 2030 to 2100 GMT.

V stands for the Vatican—Radio Vatican has a very short English language service, just 15 minutes from 0100 to 0115 GMT. There are two frequencies to tune, 5,995 and 6,015 kHz.

W is for, well, a little fudging I guess. Lacking a W country, how about some W call letters close to home, such as WYFR. This is a station known as Family Radio, a shortwave voice with a religious orientation, headquartered in Oakland, California. English programs can be heard on 6,155 kHz from 0100 GMT.

X is another that isn't x-actly an easy one to fit in our pattern. So, how about more call letters, this time south of the border in Mexico. There is a station

in Merida, Mexico, that has the call letters XEQM, but is better known as "Su Pantera" . . . Your Panther! Try this about 1200 GMT on 6,105 kHz.

Y means Yugoslavia—Radio Belgrade is the station. English can be heard at 2200 GMT on 9,620 kHz.

Z brings up the rear with Zaire—Not the easiest one wraps up our alphabetical DX hunt. Radio Lubumbashi is the station and the frequency is 4,750 kHz, around 0400 GMT.

### A DXERS CONFAB

The 1977 annual convention of the Association of North American Radio Clubs, popularly known as ANARC, an "umbrella" organization of the major DX-ing hobby clubs in this continent, will be held July 15, 16 and 17 at Schaumburg, Illinois.

DXers of any age or experience level, beginners to advanced listeners, are invited to attend, meet fellow hobbyists informally and hear prominent speakers during the three-day club meeting.

The ANARC convention is sponsored and hosted by the Woodfield International DX Club. Schaumburg is located 30 miles northwest of downtown Chicago.

For information and/or reservations for ANARC-1977, contact the Woodfield club at P.O. Box 95073, Schaumburg, IL 60195. You can attend for a part of one day or all three days, stay at the convention motel or elsewhere. You will have a good time, I'm sure. Maybe I'll see some of you S-9 readers there!

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## IN THE MAIL BOX

Jerry Hicks of Jackson, Miss., writes, "Please don't tell me I'm losing my sanity" but as I was spinning through the medium wave BC band I received the British Broadcasting Corp. program "loud and clear".

Jerry notes that he received the programming from BBC London on two spots on his MW dial, 690 and 950 kHz between 0449 and 0520 GMT, using his Realistic Astronaut 4, multiband portable with a home-brew preamp.

"I never knew that a medium wave broadcasting signal could travel so far," says Jerry.

Yes, trans-oceanic medium wave reception is possible, but I have to express my doubts that you were hearing a medium wave signal direct from the United Kingdom.

British and European stations don't use the nice, neat 10 kHz spacing we do. Those BBC stations that do come across the Pond are more likely to be on frequencies such as 647 or 908 or 1214 kHz. And it would be astounding to find such signals at a "loud and clear" level, wiping out the domestic stations that use 690 and 950 kHz.

I can't give you an explanation for your observation, though there are several possibilities that come to mind. You're not "losing your sanity," Jerry, but it is highly unlikely that what you heard was a direct-from-London MW signal.

"I thought I'd write to DX Korner," says Paul Lanuier of Closter, NJ, to let you know about some of my favorite stations."

"From Radio Havana Cuba you can hear English programs at about 0430 GMT on 6,525 kHz. To mention Radio Sofia in Bulgaria, you can listen at 6,980 kHz. And finally my favorite, Radio Nederland between 0200 and 0330 in the area of 6,165 kHz."

The Radio Nederland frequency, Paul, is on target, 6,165 kHz. But there is some difficulty in your frequency readout for Havana and Sofia. Chances are you had Radio Sofia on 7,115 kHz. But Havana doesn't operate anywhere near 6,525 kHz. At that time, listeners might try 9,685 kHz.

Finally, Bill Coleman Jr., Rocky Mount, N.C., writes to say he enjoys trying to tune stations with the same programming in parallel on medium wave and shortwave.

If you have two communications receivers, Bill suggests, try tuning Radio Sutatenza, Bogota, Columbia on 810 kHz, medium wave, sometimes heard "over" WGY, Schenectady, NY, on one set. On the other, look for duplicate programming on 5,095 kHz shortwave.

Another possibility, he says, is the Dominican Republic's Radio Clarin, with the identical programming on 860 kHz MW, and 4,850 and 11,700 kHz shortwave.

# CB RADIO/S9 FIX'M-UP

## TAKE ADVANTAGE OF THESE USEFUL SERVICES:

### HAVE TV INTERFERENCE HEADACHES?

A free TV interference instructional kit has been prepared which details how to tackle this tricky problem. Write to TVI, P.O. Box 21, Hartford, CT 06101.

### DO YOU HAVE AN A.M. UNIT NUMBER ID YET?

Many AM operators are now using Unit Number ID's in addition to or instead of "handles." They have dozens of advantages. For more information and an application to receive your own personal Unit Number ID, send a self-addressed stamped envelope to Z-Tech, P.O. Box 70-FXM, Hauppauge, NY 11787.

### 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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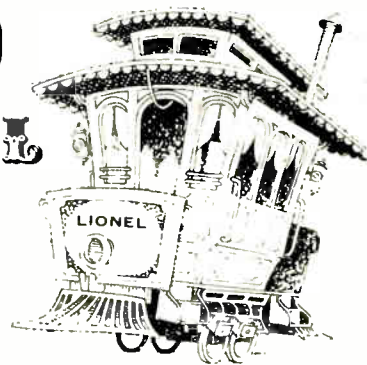
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# The Monitor Post

by Rick Maslau, KNY2GL



## MARINE RADIOTELEPHONES OUTLINED IN BOOKLET

Motorola's complete Marine Radiotelephone product line including the TRITON 55/75 Synthesized Radiotelephone and the TRITON SSB Marine Radiotelephone, is described in a new booklet. The Triton 55/75 Marine Radiotelephone is the first fully synthesized unit with simplified channel identification. Triton SSB Marine Radiotelephone offers the reliability of FM at distances greater than the 30-40 mile effective range of VHF-FM marine radio.

Other Triton Marine Radiotelephones described are the VHF-FM marine radiotelephone, the bridge-to-bridge marine radiotelephone, the VHF-FM Limited Coast Stations, the Triton FM portable radios, and the accessories available for each unit.

Copies of the booklet can be obtained from Barbara Bennett, Motorola Communications Group, Literature Distribution Center, 1301 E. Algonquin Rd., Schaumburg, IL 60196.

## 10 BAND 2 PRIORITY SCANNING MONITOR

The Hy-Gain 1518 scanning monitor combines futuristic technology with striking styling and monitoring of local PSB transmissions.



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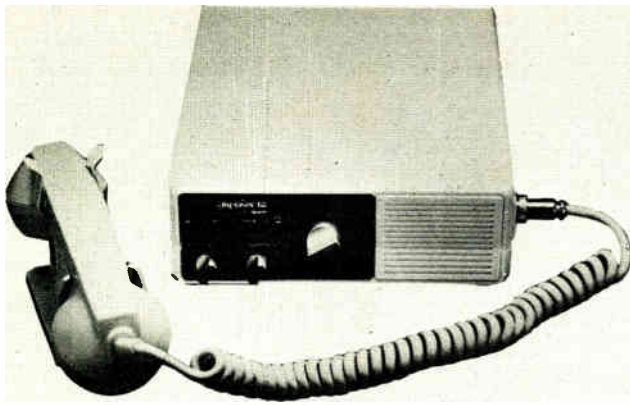
A 117 VAC w/charger adapter, 6AA batteries and 9V memory battery are supplied. The Hy-Gain 1518 is currently available at \$139.95 manufacturer's suggested retail price.

## VHM-FM 12 CHANNEL MARINE TELEPHONE

Hy-Gain announced a high performance VHF-FM Marine Radiotelephone product.

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### LAND MOBILE SHARING

The Commission has modified its allocation and assignment plan for licensing frequencies in the 470-512 MHz band for use by land mobile radio service licensees.

In the early 1970s frequencies in this band were opened to land mobile use within 50 miles of the center of the 10 largest urban areas in the country—Boston, Chicago, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco and Washington, D.C. (Later, frequencies in the 470-512 MHz band were allocated for use in the land mobile services in Dallas/Fort Worth, Houston and Miami.)

The FCC made the spectrum available in "pools" for use by one or more classes of eligible persons in the original 10 urbanized areas. There are seven "service" pools—Public Safety, Utility, Special Industrial, Business, Taxicab, Land Transportation, and Petroleum-Manufacturers. Two reserve pools—Reserve Pool A and Reserve Pool B—also were designated. Frequencies in the reserve pools were set aside to meet future requirements in the services as such needs developed.

The modification was in response to a rulemaking proceeding initiated last September 14, in which the FCC said while the pooling approach had worked reasonably well, a greater degree of "flexibility" in selecting and licensing frequencies in the 470-512 MHz band was desirable.

Under the modified plan, the FCC will:

- Reallocate to a "General Access Pool" all unassigned frequencies in the 470-512 MHz band.

- Assign channels from the "General Access Pool" only when currently licensed "service" pool frequencies are substantially occupied.

- Assign channels in this pool sequentially, where feasible, beginning with the licensing of channel pairs

at the low end of the band to eligibles in the Public Safety Services and licensing pairs at the high end of the band to eligibles in the Industrial and Land Transportation Services.

The proposals will be followed in Boston, Chicago, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco and Washington, D.C.

In Dallas/Fort Worth, Houston and Miami, the FCC said a flexible plan already is in effect and will be continued. In those areas, a single UHF (6 MHz) channel was allocated (120, 25-kHz channel pairs), and was made available in a "single" pool to be shared by eligibles in the seven "service" pools.

In Cleveland and Detroit, where no assignments have been made and border problems remain to be worked out with Canada, the FCC said its approach generally would be to follow the plan used in the Dallas/Fort Worth-Houston-Miami urbanized areas.

In the Chicago Region, the 476-482 MHz, Channel 15, frequencies currently cannot be used for normal base/mobile facilities because of UHF-TV protection requirements. Under these circumstances, the FCC concluded that the proposal to use these channels for paging, together with low power mobile operations, was in the public interest, and modified its practices accordingly.

### CELLULAR MOBILE RADIO SYSTEMS

The FCC has granted the application of Illinois Bell Telephone Company (IBT) for developmental authority to construct and operate a *cellular mobile radio telecommunications system* in the Chicago metropolitan area.

(Cellular systems are mobile radio systems that attain large capacities through the coordinated reuse of a group of radio channels. In such systems, each radio channel can be used many times in separate areas or "cells" within a single city and its surrounding area. Mobile units communicate with any of an array of cell control locations distributed about the system. These in turn are connected by wire line facilities for switching and control centers, and thus interconnected to the telephone network.)

In its decision released May 2, 1974, the Commission allocated 40 MHz of radio spectrum for the development of a high capacity nationwide cellular mobile radio system. This allocation was based, in large part, on a 1971 technical report submitted by the American Telephone and Telegraph Company (Bell), proposing use of 4-mile radius cells with directional antennas at the corners of each cell, enabling frequency reuse at distances of approximately 18 miles.

Subsequently, IBT filed for developmental authority to construct and operate a cellular mobile radio telecommunications system in the Chicago area.

By letter dated July 15, 1976, the Commission suggested revision of IBT's application, granting IBT leave to amend the application or, in the alternative, to file a new one.

(continued)



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## THE MONITOR POST (continued)

The Commission noted that IBT's application differed from the 1971 report in several key respects—it proposed 8-mile cells with omnidirectional antennas at the cell centers at greater heights than those proposed in 1971 and there would be frequency reuse only between two of the ten proposed cells and at a distance of approximately 48 miles.

The Commission said this represented a significant departure from the "small cell" concept envisioned in the 1971 report and accepted by the FCC.

It also found the application differed from the 1971 report in that IBT proposed to use 11.88 MHz of spectrum spread over 21 MHz, while the FCC had indicated that no more than 12.5 MHz (in two blocks of 6.25 MHz for base stations and 6.25 MHz for mobile units) would be authorized for a developmental system.

In addition to the technical shortcomings of IBT's application, the Commission said it raised fundamental financial and economic issues, noting that while IBT contemplated an investment of \$23.5 million it did not provide the essential cost accounting information.

The Commission also suggested a two-phase approach to cellular system development—the first dealing primarily with technical and cost evaluation of the small mode of operation and the second entailing a fully operational developmental cellular system.

Last August 15, IBT and Bell petitioned for reconsideration of the FCC's July 15 letter. Bell suggested that the 8-mile radius cell proposed in the developmental application was consistent with the guidelines set out by the Commission in Docket 18262. It also asserted that the proposed utilization of 21.5 MHz of the spectrum was "totally correct" inasmuch as the broader segment would accommodate additional frequencies as demand increased. Bell, however, agreed to limit its frequency use to two blocks of 6.25 MHz each.

The petitioners further argued that Bell's Newark, N.J., test bed would "test cellular technology in a mature, small configuration," thus making the larger cells appropriate at Chicago. They stated that Newark would demonstrate adequately the problems of frequency reuse, hand-off and interference.

Finally, with respect to the FCC's indication that the initial application failed to specify adequately the total cost incurred to date, along with projections of future costs and amortization of existing expenses over the developmental period, Bell proposed that the Commission condition its approval of the developmental authorization on the future provision of cost accounting data.

In this action, the Commission pointed out that at the time of its July 15, 1976, letter, it recognized the general validity of Bell's arguments concerning the cost-effectiveness of beginning "start-up" operational

systems as economically as possible and expanding as needed. However, it said it was not dealing with a start-up operational system here, but rather with a developmental system whose primary purpose is to test certain technical and market characteristics of the cellular approach as a basis for further rulemaking by the FCC.

Thus, the Commission said it questioned the need for such a large developmental system in Chicago, if the technical tests were to be run in Newark. It said it was willing to accept the technical findings of the Newark experiments to show the technical feasibility of a cellular system, but believed that certain conditions should be imposed on the Chicago developmental system.

Accordingly, the Commission directed IBT to submit a modification of its application frequency plan within 30 days to show that the requested frequencies would be confined to 12.5 MHz (two blocks of 6.25 MHz each) by reducing the number of frequencies employed.

It also scaled down the proposed Chicago operation and divided it into two phases—equipment and service tests, and commercial operation.

Under the equipment and service tests phase, the Commission said only the ten base station cell sites and the control point at Oak Park, Ill., would be constructed. It authorized a maximum of 2,500 mobile units, rather than the 5,000 requested, and of the mobile units authorized permitted no more than 135 to operate during the testing program, with no service to the public allowed during this testing phase.

The Commission also required that the Newark experiments and the "scaled down" Chicago system be coordinated and that joint developmental reports concerning the status of the entire system be filed every three months, beginning 90 days from the release date of the FCC's order.

On completion of the equipment and developmental service tests, the Commission said IBT could file for commercial operation and authority to serve additional mobile units. At that time, it said, IBT must provide a comprehensive financial report (covering its then current and accumulated costs, proposed charges, etc.) for Commission review prior to instituting service to the general public.

The FCC pointed out that authorization during Phase II would remain in a developmental status with no guarantees that the cellular system established under this authorization, if successful, would be approved for other areas. Finally, the Commission said that prior to conversion to regular operation, the Chicago operation together with the Newark test bed findings must demonstrate satisfactorily the frequency reuse capabilities originally contemplated.

The information received from this developmental operation and possibly from others, the Commission noted, may serve as a basis for establishing rules and regulations for this service.

(continued)

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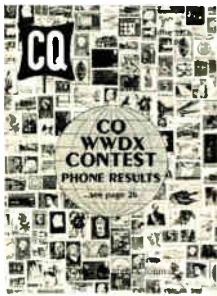
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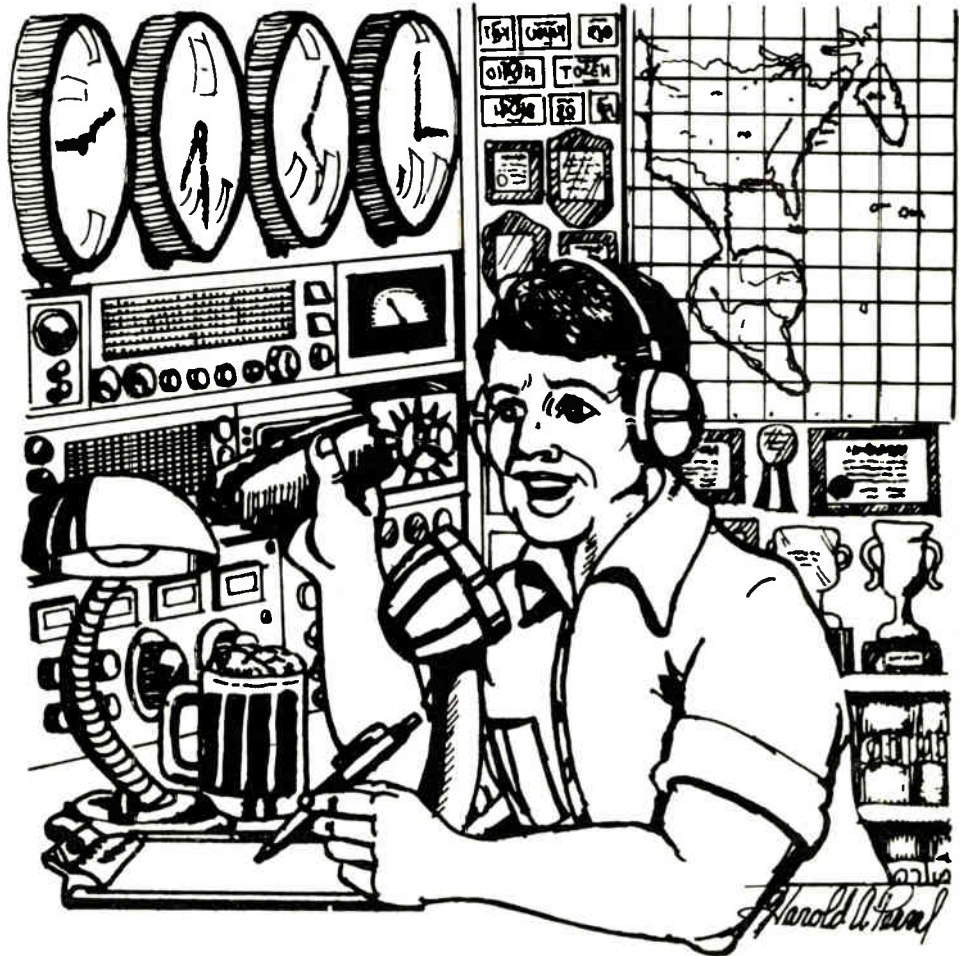
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A recent survey of S9 readers indicated that two out of every three replying to our questionnaire would like to become an amateur radio operator. And we're all for that, because CQ, The Radio Amateur's Journal, is the oldest magazine in our company's stable.

CQ is not just another ham publication; it's the only ham publication aimed at the beginner as well as the old timer. It's the only ham magazine that recognizes that every new ham isn't an electronic engineer. The editorial features in CQ are aimed at people — people like yourself who turn to amateur radio as a means of having fun.

CQ caters primarily to the operating end of radio, with just a smattering of technical material to keep you up to date on what's happening. And even the technical portions of CQ are presented in a manner that every new amateur will understand.

In other words, CQ is the fun magazine in the amateur radio field. It's the amateur magazine that you'll enjoy from cover to cover. And remember, CQ is brought to you by the same folks who bring you S9. What more could you ask for?



The  
 Radio  
 Amateur's  
 Journal  
 Since 1945

14 Vanderventer Ave.  
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Dear OM:

Enclosed please find \$ ..... for ..... Year(s) Subscription to CQ,  
 The Radio Amateur's Journal.

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One year .....	<input type="checkbox"/> \$7.50	<input type="checkbox"/> \$8.50
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### RECONSIDERATION DISMISSED IN MEMPHIS LAND MOBILE CASE

The FCC has dismissed as untimely a petition by Memphis Mobile Telephone, Inc. (Mobile) for reconsideration of the FCC's November 3 order in the Memphis, Tenn., Domestic Public Land Mobile Radio Service (DPLMRS) proceeding.

In its November 3 action, the Commission denied Mobile review of the Review Board's dismissal of Mobile's petition for reconsideration of FCC Administrative Law Judge David I. Kraushaar's approval of a settlement agreement between Airsignal International, Inc. and Mahaffey Message Relay, Inc., competing applicants for a DPLMRS paging frequency (158.70 MHz) to serve Memphis.

By order released October 3, 1975, Judge Kraushaar approved shared use of the frequency by Airsignal and Mahaffey, granted Airsignal's application, dismissed Mahaffey's application and terminated the proceeding.

Subsequently, in a petition for reconsideration, Mobile, a potential radio common carrier in the DPLMRS, contended that neither Airsignal nor Mahaffey had demonstrated a need for 158.70 MHz and that they were attempting to monopolize all available channels in the Memphis area.

The Review Board in an order released November 25, 1975, dismissed Mobile's petition as untimely and unauthorized since Mobile was not a party to the proceeding, had not shown with particularity the manner in which it had been aggrieved by the Judge's action and had not shown good reason why it was not possible to participate earlier in the proceeding.

Thereafter, Mobile filed for review of the Board's action, putting forth essentially the same arguments as in its reconsideration petition. Mobile also argued that it had tendered an application for the 158.70 MHz frequency and that an FCC Common Carrier attorney involved in the proceeding had done some work for Mahaffey before being employed by the FCC.

In its November 3 order, the Commission held that the submission of Mobile's application was not significant since FCC rules precluded consideration of such a late filed proposal and because no compelling reasons for waiver of the rules had been submitted. In addition, it pointed out that the participation of Bureau counsel had been minimal with respect to this proceeding. Therefore, the Commission concluded that the impartiality of this proceeding and the ultimate disposition of the case had not been affected so adversely as to require any further proceedings with respect to the Mahaffey and Airsignal applications.

Because Mobile failed to file for reconsideration of that action within 30 days as required by Section 405 of the Communications Act, the Commission said

the petition was not entitled to consideration and accordingly would be dismissed.

### PUBLICATIONS SELECTED

*SBE*, manufacturers of the very popular Opti-Scan scanners have announced that they are now including with the packaging of all Opti-Scan units the *CRB Research Inc.*, catalog of communications directories. Readers of this column who wish to obtain a copy of this 8-page catalog may obtain one directly from CRB Research Inc., by sending a self-addressed stamped envelope to the company at P.O. Box 56-M, Commack, N.Y. 11725. *CRB Research Inc.* is the original and leading publisher of national communications frequency directories for scanner owners. Even though their publications have inspired a number of "similar" efforts from other publishers—*CRB's* publications *still* remain the most complete, easy to use, and inexpensive! We've been recommending them for many years! No matter how much frequency data you may have assembled elsewhere, you'll find frequencies you didn't have in *CRB!*

### EXPERIMENTS OF INTEREST

KG2XKP, CHRYSLER CORPORATION, Detroit, Michigan. Experimental developmental station to operate between 26.965 and 27.405 MHz for development of a combined AM-FM-CB unit for use in automobiles.

KG2XKQ, CITY OF CINCINNATI, OHIO, Cincinnati, Ohio. Experimental developmental station to operate on 452.775 MHz to develop an automatic vehicle monitoring program.

KG2XKR, CITY OF CINCINNATI, OHIO, Cincinnati, Ohio. Experimental developmental station to operate on 173.20375 and 457.775 MHz to develop an automatic vehicle monitoring program.

KG2XKS, SSB NETWORK, Smithtown, N.Y. Experimental research station to operate between 26.965 and 27.405 MHz to conduct experimentation in connection with single sideband communications in the CB service.

KG2XKT, D. F. ELECTRONICS, INC., Hamilton County, Ohio. Experimental developmental station to operate on 154.57 and 154.60 MHz to develop a FSK/FM alarm reporting system.

KG2XKU, CALSPAN CORPORATION, Cheektowaga, New York. Experimental research station to operate on 15.460 MHz to conduct experimentation required by a contract with the U.S. Government.

KG2XKV, CALSPAN CORPORATION, Cheektowaga, New York. Experimental research station to operate on various discrete frequencies between 15.412 thru 15.688 MHz to conduct experimentation required by a contract with the U.S. Government.

KG2XKX, THE UNIVERSITY OF TEXAS AT DALLAS, Richardson, Texas. Experimental research station to operate on various discrete frequencies be-

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City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
CB Registration: Make \_\_\_\_\_  
Model \_\_\_\_\_ Serial # \_\_\_\_\_  
Applicants Signature \_\_\_\_\_  
Handle \_\_\_\_\_ F.C.C. # \_\_\_\_\_

tween 4637.5 and 7985.0 kHz and 152.35 and 154.2 MHz to conduct experimentation required by a contract with the U.S. Government.

KG2XLA, WULFSBERG ELECTRONICS, INC., Overland Park, Kansas. Experimental developmental station to operate on 151.8725, 163.1275 and 173.3450 MHz for synthesized airborne transceiver and direction finder for ultimate service in parts 83, 89, 91 and 93.

KG2XLC, BRISTOL ELECTRONICS, INC., New Bedford, Mass. Experimental developmental station to operate on 156.425, 157.000 and 157.300 MHz to develop new radio equipment for use in the marine radio service.

KG2XLD, SAFETRAN SYSTEMS CORPORATION, Louisville, Kentucky. Experimental developmental station to operate on 160.575 and 161.235 MHz to develop a radio to landline automatic interconnect equipment for railroad and industrial communications.

KG2XLE, SAFETRAN SYSTEMS CORPORATION, Louisville, Kentucky. Experimental developmental station to operate on 161.235 MHz to develop a radio to landline automatic interconnect equipment for railroad and industrial communications.

KG2XLG, THE MAGNAVOX COMPANY, Harlan, Indiana. Experimental research station to operate on various discrete frequencies between 55.25 and 211.25 MHz to test TV receiver tuners for direct cochannel interference.

# Dealer Business Card Advertisement

*This advertising section is reserved exclusively for CB dealers who wish to keep their name in front of their local customers, but who would otherwise not advertise in a national publication. The ads included are limited to one column inch; advertising copy is limited to non-mail-order type. The costs for business card ads are \$45.00 prepaid. In addition to the ad in the business card section, each dealer participating receives twenty five copies of the issue containing his ad, to sell or pass out in his store. For further information, dealers should contact the publisher, S9 Magazine, 14 Vanderverter Ave., Port Washington, NY 11050. Phone: 516/883-6200.*

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Between Myrtle & Central Ave.

(212) 379-2450 AM-SSB-FM SCANNERS  
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# 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.

We do not bill for advertising in CB SHOP. Full remittance must accompany all orders

sent in; otherwise ad will not be run or acknowledged. We reserve the right to refuse to accept any advertising which we feel is unsuitable or inappropriate.

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 Vanderver Ave., Ft. Washington, N.Y. 11050.

I'M LOOKING FOR A USED CB SET - any kind. Must work or need only minor repair. I'll pay shipping. Send particulars including price. All correspondence answered. Lisa Foster, Box 522, Levittown, PA 19058.

VOICE POWER at your fingertips. The "Silver Eagle" Astatic microphone can be yours for only \$59.50. Your check or money order brings your TUP9-D104 prepaid to you. No C.O.D.'s. Winn Auto Parts, Inc., Box 1424, Del Rio, TX 78840.

WANTED!!! Demco Modulators. Will pay according to condition. Call collect. 201-363-2853.

YOUR CB CALLSIGN or handle carved in walnut stained pine. Approx. 4 x 20 inches. \$8.00 each. Sawdust, Dept. S9, PO Box 327, Stevensville, MI 49127.

MONITOR AND CB SYNTHESIZED Crystals \$4.95 each. Walkie talkie crystals \$4.95 per set. Include make and model number (also station frequency for monitor crystals). Please enclose certified check or money order. No COD's or personal checks. Rolin Distributors, Dept. S, PO Box 436, Dunellen, NJ 08812.

THE CB DEALER'S HANDBOOK Secrets of making big money selling CB. Start at home with little or no investment. How to do it right & avoid costly mistakes. Buying, advertising, markups & more, explained in layman's terms. Only \$4.95 postpaid. Vann, 107 Hopper Ave., Ithaca, NY 14850.

CB BUTTONS, 2 1/4". No. 101 CB'ers do it with frequency. No. 102 we brake for beavers. No. 103 CB'ers have more fun. No. 104 CB'ers do it better. No. 105 CB radio saves lives. No. 106 I love CB radio. \$1.00 each, add 25 cents for postage, to Jim Hill, 1819 McComb, Charleston, IL 61920.

BOOST YOUR CB OUTPUT without linears. Boosters easily built with Radio Shack parts or equivalent for \$16. Plans and parts list base and mobile, \$7 or each \$5. Quick Service Plans, Box 868, Clemmons, NC 27012.

PROFESSIONAL CARTOONIST will draw original one-of-a-kind, QSL cards. Three colors, costs. Describe note and \$10.00 to Alex's Cartoons, Box 1233 Seneca, SC 29678.

QSL 101% Huge buddy packs. The more you send the more your collection goes up. G. McGuire, 1743 Summerfield St., Brooklyn, NY 11227.

CARD SWAPPERS DIGEST Send name, address, \$1.00 copy. Your name will be published immediately. Cards, Drawer P, Lexington, N.C. 27292.

SPECIAL MONEY MAKING OFFER! Full information and sample (\$3 value). Send \$2. Tower 9813SU, Charleston, SC 29410.

"BIG MOUTH MIC PREAMP" Convert your CB mic to power mic. Send \$2.00 for simple plans, also available plans for SWR/FS, 12V power supply. Protech Co. Box 638, Lake Ronkonkoma, NY 11779.

BUILD 21 HIGH PERFORMANCE Antennas-Designs, Dimensions, Drawings only \$3.00. Novice Code Cassette course, instructions, only \$3.50. Beams, Box 278, Lawton, MI 49065.

QSL 100% Huge buddy packs. More you send, more you get. J.P. Bartling, Box 15424, Orlando, FL 32808.

DEALERS MOVE UP TO THE BEST; TRAM We offer you the best wholesale prices on Tram. Send letterhead or business card for the lowest wholesale prices in the country. Power Communications, Box C, Whitesboro, NY 13492.

"ATTENTION" New CB'ers let the tall Texan T.T.J. pick your handle. Send name, age, sex, and occupation along with \$1.29 to T.T.J., 2615 Cooksbury Drive, Durham, NC, 27704. Fast reply!

SPECIAL 600 QSL IRC's only \$3.00. QSL Catalog (\$5.00 deposit required). Tower-SU, Drawer 10083, Charleston, SC 29411.

SSBers! GET YOUR LV NUMBERS for SSB. Join the Laughery Valley SSB Club. Roster and Membership cert. all for \$2.00. Write LV 1-PO 4, Osgood, IN 47037.

FEDERAL GOVERNMENT DIRECTORY 1300 Channels. Lists nationwide frequencies for FBI, Secret Service, etc. \$5.00. Bearcat 101 programs for 700 channels not in owners manual, including federal government channels, \$5.00. Channel directories for Colorado, Nebraska and Wyoming, \$3.00 each. Blake-man Electronics, Box 288, Dupont, CO 80024.

40 CHANNEL CB QUAD BEAM ANTENNA No bamboo, no stubs, unique gamma match tunes flat, common hardware parts, 10 page plans \$3.00. McKoll Electronics, Dept. S, 2730-A S. Rosewood, Santa Ana, Calif 92707

POLICE SCANNERS' MONITORS. Choose from name brands like Regency, Bearcat and others. Also crystals, antennas, and frequency directories. Complete selection of Citizen Band transceivers, antennas, and accessories. Harvey Park Radio, PO Box 19224, Denver, CO 80219.

CB CLUBS 3-line Engraved Pin Badges, \$1.50. Free sample and information to clubs. Wharton Plaques, Worcester, NY 12197.

SAVE TIME AND MONEY ON YOUR SET'S repairs. Use new, revolutionary "CB Radio Troubles Finder. Handy...easy to use. Just dial the set's symptoms and know instantly... automatically...proper checking procedure, adjustments, repairs, etc. Every CBER needs one. Only \$4.95 plus 50 cent postage. Order today from: Associated Technical Institute, Box 2576E, Hialeah, FL 33012. Dealers wanted.

CB DIRECTIONAL FINDING LOOP Antennas. Pinpoint any CB transmitter in minutes. Send \$14.95 check or money order to Ruden Enterprises, Box 1023, Frazer, PA 19355. For fast service (COD) call 215-363-9452.

WOW! \$1.00 ENGRAVED HANDLE-CALL Pins. No minimum order. Fast. 1"x 3" White letters on red, blue, black, green, walnut. Black on white or yellow. Max line (1 or 2): 16 letters, spaces. Guaranteed. Holly Engraving, Box 3926-V, Hollywood, FL 33023.

CRYSTALS American manufacturer has the following crystals available: Special cut CB, high freq. CB, PLL, Standard CB, Ham-2MHZ up, two meter and monitor. Many units available from stock. We welcome small dealers. Write or phone Custom Crystals, Inc., 7616 Burlington, Omaha, NE 68127. 402-592-5320 Send 50 cents for catalog.

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; Corinthians 9:22 & 16:9. Send stamp: Christian CB Club, Box 21611, Concord, CA 94521.

HIGH COUNTRY Colorado CB cookbooks. Unusual recipes from Skiiland. \$1.50 each, no stamps please. Address Coffee Breakers, 216 N. 14th St., Canon City, CO 81212.

40 PLUS CONVERTER Your 40-Channel conversion kit, fits all 23-channel AM rigs. \$39.95. John D. Wheilan, 11301 Melody Dr., 308, Northglenn, CO, 80234.

YOUR OWN QSL POST CARDS! True custom design, 15 colors, durable glossy cards, prompt personal service, unbeatable guarantee. As low as \$14.50 per thousand, including free art! Don't settle for less. For free brochure write, Chester QSL's, 402 Merchant, Emporia, KS 66801.

QSL DEALERS WANTED Free Facts, write today. Cards, Inc. PO Drawer P, Lexington, NC 27292.

CRYSTALS CB, Ham, Monitor. All radios AM, SSB. Regular and Synthesizer. Business Band & Special Freq. Fast Service. Dealer Inquiries invited. \$5.95 each. Xtals, Dept. J, Box 42, Prospect Hts., IL, 60070.

CB'ers...GET YOUR ARC NUMBER and join the only organization that represents all radio hobbyists. Get more radio privileges! Free details! American Radio Council, Box No. 1171, Garland, TX 75040.

QSL CARDS Something completely Different Nothing even close to it on the market! The "Cadillac" of QSL's! Samples: \$1.00, refundable. Mac's Shack, Box No. 1171-B, Garland, TX 75040.

PERSONALIZED BADGES Only \$1.50! Send name, handle, call letters. Postpaid. Mac's Shack, Box No. 1171, Garland, TX, 75040.

IT'S A PERSONALIZED BELT BUCKLE It's a work of art with your Handle worked into the design. Each buckle hand-made by expert craftsmen. Only \$6.00 apiece. Write J.C. Leather, Box 173, Marshall, MN 56258 for more info. Club and dealer discount inquiries invited.

**ATTENTION CB DEALERS:** Having hard time getting CB sets? We carry a full line, including Pearce-Simpson, Robyn, Browning, Johnson, Royce, Police Monitors, Crystals, New-Tronics, Antenna Specialists (E & S CB Sale & Service) R4, Winchester, IN 47394. Phone 317-584-0343.

**CB RADIOS, VHF/UHF monitors, crystals, antennas.** All brands. Lowest pricing possible. Southland, PO Box 3591-F, Baytown, TX, 77520.

**C/B HAM DEALERS.** Send your letterhead for free catalog. Siltronix, Swan, Midland, Pearce-Simpson D & A, Black Cat, Hustler, Avanti, etc. Appliance & Equipment Inc, 2331 Vance Jackson, San Antonio, TX, 78213. 1-512-733-0334.

**QSL CARDS** 2 color 12 pt. glossy white, 500 for \$10.00, 1,000 for \$18.00. Over 300 designs. Catalog & Samples, \$1.00. Lile Guill-Rustburg, VA 24588.

**LIGHT YOUR EARS!** Micro CB Antenna Earlight mounts in one second to the tip of your CB (or SSB) antenna and lights when transmitting. Verifies function of final output stage of your 4 watt (or fgreater) transceiver. Special 25,000 hour neon bulb in unit draws less than .06 watt. \$3.00 or 2/\$5.00. N.Y. residents add sales tax. Firefly Enterprises, Box 471-S, Richmond Hill, NY, 11418.

**FREE FULL COLOR QSL CARD CATALOG** Cards, Inc. Drawer P, Lexington, NC 27292.

**CBers...Fine silver and gold CB jewelry.** Send for free brochure. CB Jewelry, PO Box 291, Oakland Gardens, NY 11364.

**LINEAR AMPLIFIERS** Amateur Base and Mobile Amplifiers. Discounts on Kenrich, Palomar, J.V. Associates, General, Hyden, V-J Products, Pride. Also discounts on CB Antennas and meters. Pere Company, 108 Garfield Place, Cincinnati, OH 45202.

**SCANNER OPERATORS!** Are you registered? Be assigned your own personal monitoring ID letters inscribed on beautiful 2-color bordered certificate, plus discounts and goodies! Thousands already registered! Only \$5, ppd. from CRB Research, Box 56-X, Commack, NY 11725.

**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 and free gift offer. Send letterhead to: PALOMAR EAST LTD., Palomar Plaza, P.O. Box 148, Congers, NY 10920.

**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.

**FOR THE BEST IN CB & AMATEUR GEAR.** Tempo One. Siltronix 1011B & Skipper 73. For immediate delivery, call or write: PALOMAR EAST LTD., Palomar Plaza, P.O. Box 148, Congers, NY 10920. (914)268-9258.

**UNIT NUMBER ID'S!** Everybody's using them these days! Don't you have yours yet? Your existing Unit Number registered or a new one assigned to you by the national registry for ALL Unit Number ID's; PLUS a 2-color official Certificate of Registration showing Unit Number, your name and/or handle, the date of registration; PLUS exclusive special report on how thousands of CB'ers are now getting more use and enjoyment from their hobby by using Unit Number ID's in addition to or instead of "handles." Everything for only \$2.95, plus self-addressed stamped envelope. Z-Tech Enterprises, Box 70-W, Hauppauge, NY 11787.

**OFFICIAL ID CARDS/CREDENTIALS** for Police Dept./Deputy Sheriff/Highway Safety Patrol/Volunteer Ambulance Corps/Rescue Squad/Fire Dept.! Beautiful professional 2-color wallet size ID cards. Sent blank (we do not inscribe name). Available in large or small quantities. Sample set of all 6 cards only \$3, ppd., PLUS FREE BONUS Official CB Operators ID Card. Civil Defense credentials also available to authorized CD units. Order now! CRB Research Inc., P.O. Box 56-X, Commack, NY 11725.

**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 Vanderventer 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.

**ASSOCIATE MEMBERS WANTED** to join American CB Radio Club. Receive attractive club buckle, membership card, permanent club ID number, 10-code, CB language, bumper sticker, etc. Associate membership only \$8.00 a year— mail check to: American CB Radio Club Inc., PO Box 321, Bronx, N.Y., 10469.

**KING QUAD BEAM PLANS** Highest Possible Gain, least possible cost. Complete plans, pictures, and hints on how to build and erect, \$10.00, PO Box 11517, Albuquerque, N.M. 87112.

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**BEARTECTOR RADAR DETECTOR** from Prime Electronics \$79.95 plus \$2.00 shipping. Beats Fuzzbuster and all others. Receives all moving radar. Many CB products at lowest prices. No dealers please. Catalog 25 cents. Lee Sales Company 6912A Marion Shawnee, KS 66218.

**CB HAMMER PROTECTS YOUR HOME.** Will be able to control your CB and tape recorder in an emergency, causing a pre-recorded alarm message to be broadcast to CB-ers ready to bring aid to the scene. Our \$1 bulletin tells how you and your neighbors can make the system work. CB Hammer, Auburn Enterprises, 225-A McClendon, Auburn, AL 36830.

**GLOW-WORM** lights your mobile antenna tip. Converts radio waves to red light. No wires to connect. Use on coil loaded antennas. Guaranteed. \$1.25 postpaid. Box 473, Columbia, MO 65201.

**BATTERY CHECK** shows condition of your vehicles electrical system under all driving conditions. Detect trouble before it becomes catastrophic. A must for mobile CB. Deluxe thru-panel, BC 12 DTP \$39.95. Economy thru panel, BC 12 ETP \$15.95. Economy dash mount BC 12 EBK \$18.50. Write for Battery Check Report. Dealer and Distributor inquiries invited. Electronic Specialists, Box 122, Natick, MA 01760.

**'CB'** Sell new engraved metal "CB" plates for big profits. Make \$1.50 per sale. Free Sales Kit. Engravaplates, Box 10460-CB45, Jacksonville, FL 32207.

**CB RADIOS AT WHOLESALE PRICES!** Listing 50 cents. Going Ham? YAESU FT-101E in stock. Sideband Specialty, Box 573 DC, Oak Harbor, WA 98277.

**CB POWER SUPPLY** regulated and protected, material costs under \$20.00, increases CB Power Output, complete design and construction details only \$4.00. Send Check or money order to MJD Design, 5001 Highline Road, Crystal Lake, IL 60014.

**BEST PRICES** On Johnson, SBE, Motorola, Browning, Midland, Courier, Antenna Specialist, Avanti, Antenna, Inc, Shakespeare, Turner, Astatic, Mura, Para-Dynamics, Vanco, and Gold-Line. Write for free price list. CRS Communications, 1552 Central Park Avenue, Yonkers, NY 10710.

**BE AN EMERGENCY CHANNEL 9 MONITOR.** We'll show you how. We invite you to join the United States Emergency Assistance Radio System (US EARS). Members identify with their state name (such as Louisiana State Emergency Radio). We are now accepting Individual and Team membership nationwide. For information and a membership application, send a self-addressed stamped envelope to: US EARS, Headquarters, PO Box 1956-A, San Jose, CA 95109.

**CB RADIOS AT WHOLESALE PRICES!** Listing 50 cents. Going Ham? YAESU FT-101E in stock. Sideband Specialty, Box 573 DC, Oak Harbor, WA 98277.

**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.

**FUZZBUSTER RADAR DETECTORS,** tremendous discount, Master Charge. Immediate shipment guaranteed. H & B Enterprises, Box 477, Candler, NC 28715.

**CB DEALERS** Send today for our price list, same day service. Reputable company in CB business for over 8 years. Over half-million dollar inventory. CB Distributors, Box 15883, Baton Rouge, LA 70815.

**CB PAGING SYSTEM!** Call your base or mobile station while their radio remains silent! Stop listening to noise, voices while waiting for a call. Beautiful styling, low cost, retail-wholesale. Phasic Systems, 11010 SW 88th St, No. F-215, Miami, FL, 33176.

**BREAKER...BREAKER!!!** Spin-dial 57 Tencodes...glance at 64 CB Jargon definitions on-the-spot. Quick, easy to use Road Coder. Clips to all visors, any vehicle. \$1.95; 2 or more \$1.75 each. Money-back guarantee. Rush order to: HAAS Enterprises, PO Box 14002, Raleigh, NC 27610....10-10.

**WANTED ANTIQUE GLASS**—Looking for old milkglass purple, slag, carmel and green-town too. Tell me what you have—I pay the highest prices. Write, Jack Schneider, c/o Cowan Publishing, 14 Vanderventer Ave., Port Washington, NY 11050.

**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 \$1.00 each ppd. Dealers wanted! Sidebanders' Service Bureau, Box 381-Y, Smithtown, NY 11787.

**POLICE/SHERIFF SHOULDER PATCHES!** Authentic! Exclusive! Rare! Limited Supply! Multi-colored embroidered uniform patches from actual agencies. No lists, our choices sent, while supply lasts! 5 different only \$5, ppd. CRB Research, Inc., P.O. Box 56-X, Commack, NY 11725.

**WANTED FOR \$\$\$CASH!** Back in 1957 the Lionel Train Company made a small set of toy trains specifically designed for girls. It had a pink locomotive and several other cars, all in pastel shades. The set wasn't very popular, hence not too many sold. However, I need this set for my collection, and am willing to pay up to \$400 cash for a complete set in mint condition. If you have this item please write: Dick Cowan, S9 Magazine, 14 Vanderventer Ave., Port Washington, NY 11050.

**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.

**SECRET SCANNER FREQUENCIES?** Many public safety and federal gov't. agency frequencies are "unlisted"—that is, "missing" from frequency listings 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.

**LOOKING FOR OLD LIONEL TRAINS.** Interested only in "0" 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, WA2-LRO, c/o S9 Magazine, or call 516/883-6200.

**SINCERE CH.9 MONITORS**—We need one Chartered team in each county in the U.S. Canadians welcome. Write Highway Assistance Modulators, 5221 Creekwood Dr., Harrisburg, PA 17109. Team protection assured.

**18 WHEELERS!** For orders on the record "Chicks" sung by Jim Wheeler, lyrics by Glen Wells. Write, N.U. Records, 2012 Beech Ave, Nashville, Tenn. 37204.

**QSL's SAMPLE KIT** 25 cents. Immediate attention and courteous service. G.E. French, PO Box 101, Poestenkill, NY 12140.

**MOBILE IGNITION SHIELDING** provides more range with no noise. Available most engines in assembled or kit-forms, plus many other suppression accessories. Free literature. Estes Engineering, 930 Marine Drive, Port Angeles, WA 98362.

**CB RADIO SLIDING CAPABILITIES** Ham radio conversions to CB easily achieved using simple tools. Step by step illustrated instructions available. Details, \$1.00, refundable. Technical Publications, Box 649-S7, Milwaukee, WI 53201.

**CB ANTENNA CONSTRUCTION MANUAL**—assemble beams, quads, groundplanes, roll up tennas, from common hardware, save 80%, simplified non technical instructions with pictorials assure quick easy assembly, excellent performance. Complete \$3.00. Tenna Farm, 1117 Dewitt Terrace, Linden, NJ 07036

**SUITABLE FOR FRAMING!** Beautiful 8 x 10 color poster, "There's no other hobby.... quite like CB!" \$3.00. Universal, 29 Old Orchard, Dept. P-2, Portchester, NY 10573.

**HORNET ANTENNAS SELL BEST.** Immediate delivery. Dealer inquiries invited. Hornet Antenna Products, Box 880, Duncan, OK, 73533.

**DEALERS ONLY!** Send letterhead for free price sheet. Same day service, most major brands in stock, competitive prices, personal service, monthly specials. Dixie CB, Rt. 3, Box 517A, Prairieville, LA 70769.

**CB'ers;** now you can display your handle or call letters with a beautiful custom bumper sticker. Self adhesive silver/white reflective polyurethane background. Letters or numbers available in choice of four colors, red, green, blue or black. Dimensions 4"x18". 15 letter maximum. Send check or money order for \$3.50 with printed handle or call letters, plus return address to "Handles Unlimited", PO Box 9634, Bay Village, OH 44140.

**TRI-EX TOWER** Model 3-54, galvanized Steel, self-supporting with winch and cables, needs base, available from factory, \$700.00 FOB Endicott, NY, KR Hancock, PO Box 299, Endicott, NY 13760. Telephone (607) 748-1501.

**OFFICIAL CB OPERATOR'S KIT** Revised and Updated, a 40 channel CB companion. Complete kit includes, CB road map showing handles of major US cities and channels used on major highways, and on the back, big 10-33 sign to display in case of emergency; revised, durable sunvison code card, four-color CB car decal with space to write in your handle, most up-to-date, 92 pg, CB operators reference manual and log available with, CB buddy section, CB log section, 46 pgs of CB jargon, FCC rules and state police and highway patrol monitoring, manufacturers, CB organizations, much, much, more and fits easily in glove compartment. \$8.95 ppd, 45 cents postage. R.L.C. Industries, 14104 Mandarin Oak, PO Box 23056B, Jacksonville, FL 32217.

**ATTENTION! DON'T BE LEFT OUT!** Get your handle registered in the 1978 National CB Handle Directory so you can "jaw jack" with all of your "good buddies" wherever you travel. To register your handle and receive a copy, send name, address, handle, channel and any ten word message along with \$3.50 (check or money order) to Arjay Associates, 777 Court Street, Suite 403, Reading, PA, 19601. Act now and get your fellow CB'ers in on it!

**DEALERS WANTED** Profitable sparetime business, best wholesale prices, CB radio/antennas/monitors/accessories. Central USA for best shipping. Send card or letterhead for price sheet. Sunridge Electronics, Inc, Rt. 2, Box 375 S, Hillsboro, MO 63050.

**GUARANTEED 100% QSL** Cards with numbers only. Buddy packs to 100. Extras appreciated. KCO 2682, PO Box 8726, Boston, Mass. 02114.

**QSL QSL QSL WORLDWIDE QSL** Send QSL cards to Philip Steven Kurland, 357 East 201 St Apt 1-F, Bronx, NY 10458.

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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 112 and 113, 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.

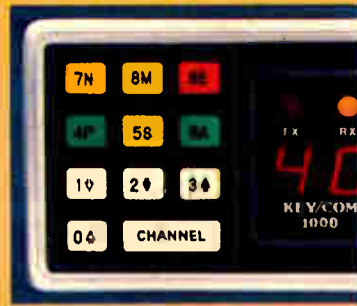
Readers should be aware that, at the present time, the CB radio market is drastically backordered in almost every product category, but especially so in transceivers and antennas. We wish to remind our readers that we carefully screen all potential advertisers. In the event that a company's products 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.

# At 55 mph, CB ought to be as easy to use as a push-button radio.

SBE Key/Com 1000, an entirely new experience in CB radio that has a micro-computer as its heart. A keyboard entry control system lets you do things no other CB radio can do. And do it as easily as operating a push-button radio.

With keyboard entry, you can tell the computer to do something as simple as change channels. Or as sophisticated as remembering any 10 channels you select... Channel searching for locating active channels... Automatic transfer to priority channels of your choice... Periodic channel 9 monitoring...



CONTROL PANEL  
**SBE KEY/COM 1000**

Instant keying for emergency channel communication... And more.

Naturally, you get full legal power, a large, bright LED channel readout, and all the other controls you'd expect from a luxury SBE mobile CB.

The Key/Com 1000 is waiting for you at your SBE dealer. Go see it... the one CB radio with a brain.

Better Communications through Creative Technology



For information write  
SBE, Inc.  
220 Airport Blvd.  
Watsonville, CA 95075

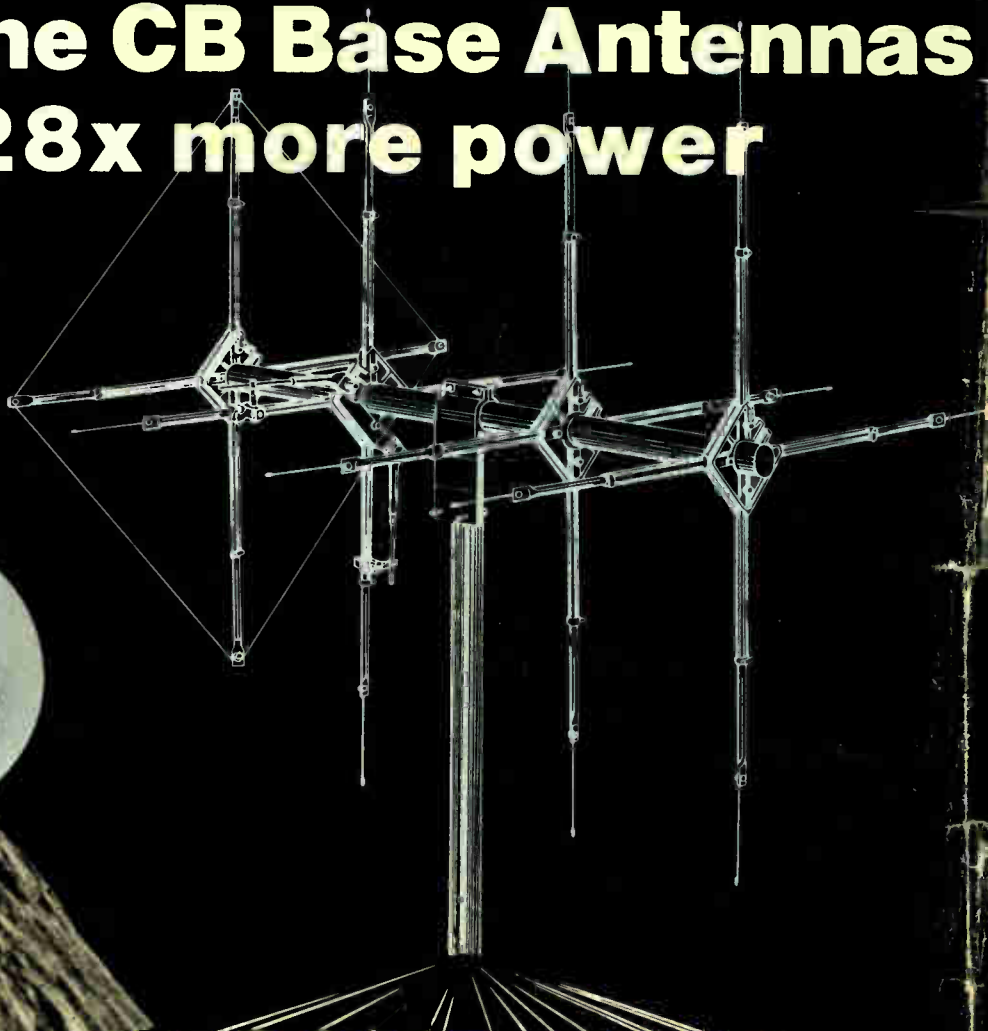
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# AVANTI® MOONRAKER

## King of the CB Base Antennas

### for 28x more power



# MOONRAKER®

N.A.S.A. PHOTO

The AVANTI **CO-INDUCTIVE**™ principle makes the the Moonraker the ultimate in CB antennas.

The MOONRAKER Dual Polarity design follows that of the original Moonbounce antennas used to rebound signals off the moon.

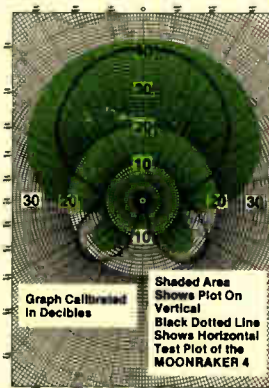
The close spacing of the elements increases coupling and signal excitation while the AVANTI P.D.L. reflector is the best available. AVANTI's co-inductive matches provide correct feeding impedance, improve power handling ability and eliminate coils which can detune or burn out.

The mechanical construction is typical of AVANTI's aerospace craftsmanship, using cast aluminum hubs, extrusions, and aircraft quality aluminum throughout.

A fine point: The ends of each dipole element are extended by the use of stainless steel wire, which decreases wind loading profile.

Each antenna comes with the new AVANTI switchbox which allows instant switching between vertical and horizontal modes.

AVANTI's switchbox makes contact before it breaks, therefore eliminating RF arcing and subsequent burnout or loss of efficiency.



**WHY DUAL POLARITY?** With the crowded channels these days, a vertical is needed to work mobiles and other verticals, but those in the know go to horizontal when they wish to quiet things down. The horizontal is especially valuable when you realize that most hash from automobiles, etc., is vertically polarized and can be quieted by about 25 db when operating horizontal.

#### SPECIFICATIONS FOR MOONRAKER 4 — Model AV-140

Gain — 14.5 db over isotropic	Length — 16.5 ft.
Front to back separation — 38 db	Rotor required — medium to heavy duty
VSWR — 1.2:1	Power multiplication — 28x
Impedance — 50-52 ohms	Power capability — 2 KW
Vertical to horizontal separation 25 db	Bandwidth — full 40 channel
Weight — 24 lbs.	Wind load (sq. ft.) of beams — 5 sq. ft.

**Avanti makes a complete line of base and mobile CB antennas from \$11.95 to \$404.00.**

# avanti

For free catalog, write:

AVANTI RESEARCH AND DEVELOPMENT, INC., 340 Stewart Avenue, Addison, IL 60101

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