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ALL ABOUT CB TWO-WAY RADIO

A layman's plain-talk guide to the equipment, rules and benefits of low-cost citizens band two-way radio for business, family and personal use

BY RADIO SHACK'S EDITORIAL AND TECHNICAL STAFF • 120 PAGES • 1976 EDITION


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ALL ABOUT CB TWO-WAY RADIO

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PREFACE

To some readers it may come as a surprise to learn that Radio Shack has been a leader in the CB business since 1959 and has fielded a Realistic CB line since 1960. We and CB have been around together for a long, long time. Surprisingly, it took most retailers and the financial press about 15 years to recognize CB for what it really is — a telephone system for whose use you don't have to pay Ma Bell a nickel (later a dime, now two dimes) a call to use.

The old-style CBer seemed to be a born DOC rule-bender with an irresistable urge to talk about equipment, not always in cultivated language. But his shennanigans with the equipment created the need for rugged reliability and better selectivity. Being somewhat of a know-it-all, our book (62-2044) ***The Realistic Guide to CB Radio*** is just fine for him.

But the recent surge in sales and its correspondingly broader market base among such diverse groups as truck drivers, college kids, and nervous tourists, created a demand for a book for so-called laypersons. Our alleged right to produce such a tome stems from our alleged preeminence in all phases of the business. After all, we make our own cable, antennas and crystals; we design our own transceivers; our product is sold worldwide — wherever the blessings of CB are type-accepted by the people in power.

So here it is: the beginners bible of the Citizens Band. It's one of the few books guaranteed (by the size of the print run) to be a best seller before publication.The DOC has many rule changes under consideration. We will update whenever these come into law. Nothing, however, threatens the usefulness of equipment on the market today for many years to come.

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INTRODUCTION TO CITIZENS BAND RADIO

GRS, or CB, as it is usually referred to, is a two-way radio service licensed by the Department of Communications, and intended for short distance (under 30 miles) personal and business audiocommunications. Having a CB two-way radio in your car is almost like having a telephone in your car and it's just as easy to use. It gives you many of the advantages of a mobile telephone for a very modest initial investment and no continuing service charge or cost per call—no matter how you use it! In some cases, CB allows you to communicate with places where a telephone could not reach.

A Citizens Band radio can be installed in your home or office, mounted in a vehicle, or carried with you wherever you go. You can use CB two-way radio in your car, truck, recreational vehicle, boat, golf cart, airplane, tractor or mobile home.

The possibilities for using CB radio are practically limitless. Use it for business, for personal communications, or both. The use you personally can make of CB will depend on your occupation (salesperson, farmer, trucker, serviceperson, doctor, lawyer, private detective, executive, plumber, rancher, etc.), how you spend your leisure time (traveling, hunting, fishing, boating, camping), where you live (city,

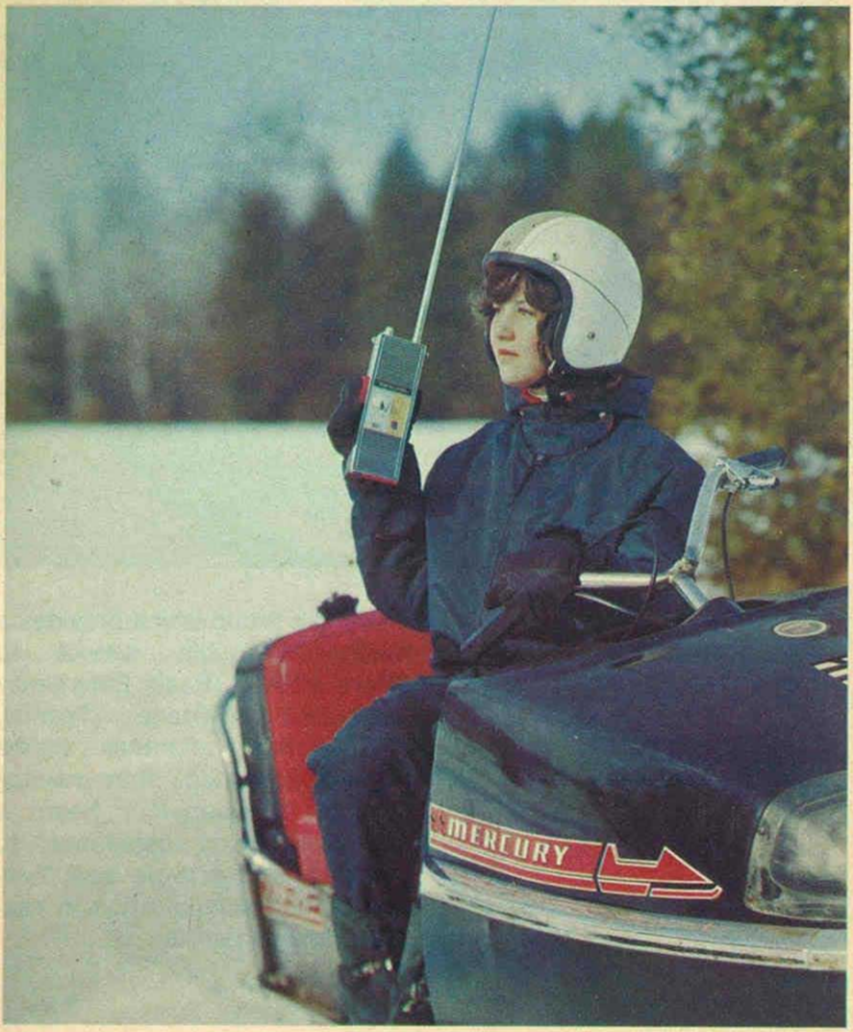
country, desert, small town), and many other factors.

You can use CB to provide communication between your car and your home or office, or between your home and office; a nurse or doctor may use it to keep in touch with a hospital or particular patient; commercial services use CB to dispatch their cars and trucks.

Use CB to call home if you're stuck in traffic and will be late for dinner; call your spouse on his or her way home from work if you need extra groceries, or to have the clothes picked up from the laundry; use CB to keep in touch with the babysitter or with a neighbor while you're out shopping.

Two-way Citizens Band radiocommunications are used by forestry services, ski patrols, TV technicians, surveyors, electricians, construction crews, security patrols, highway maintenance crews, business executives, truckers, farmers and salespersons. Boaters use CB for economical ship-to-shore communications. Racing teams use it to communicate between driver and pit crew.

NOTE: For laws regarding usage of your CB read Radiotelephone Handbook which can be obtained from Telecommunications Regulatory Service, Department of Communications, 300 Slater Street, Ottawa, K1A 0C8



There is a group which provides a worthwhile public service to CBers' REACT (Radio Emergency Associated Citizens Teams). REACT has volunteer teams throughout Canada that monitor channel 9 twenty-four hours a day to provide assistance to motorists and provide local two-way radio communication in response to emergencies.

1 Taking the Mystery Out of CB

Citizens Band Radio is easy to understand, and even easier to use. There is really nothing mysterious about it—anyone can operate a CB radio with no more technical skill than it takes to use the telephone or tune in television.

The purpose of this book is not to help you qualify for a degree in electronics engineering, but simply to let you know what CB radio is and how you can use it. We've included just a touch of technical information to let you know how it works. Should you want to learn more about the technical side of electronics, your local Radio Shack store or dealer has an excellent selection of books including everything from an Electronics Dictionary through Integrated Circuit Projects. We especially recommend From 5 Watts to 1,000 Watts, a complete programmed course in electronics theory plus other information required for an Amateur Radio licence.

Background

Two-way radio for the use of the general public, officially called the General Radio Service, originally came about in 1947. At this time the United States, Federal Communications Commission (FCC), recognized the need for a type of two-way radio service which could be used by a far greater number of individuals and businesses than the existing business, public service and Amateur Radio services. However, this first Citizens Radio Service was severely limited in function. Equipment for it was expensive and not very widely available. Communications were unreliable and limited practically to line of sight — not much of an improvement over smoke signals!

Citizens Band radio as we know it today got its start in 1958.

The new Citizens Radio Service or General Radio Service, its official title in Canada, made possible far more effective communications with greater range and reliability. The cost of modern CB radios, unlike almost everything else, is actually lower today than it was in 1958 — and you get a lot more for your money! Modern solid-state (all transistor) CB radio equipment is as far removed technologically from early tube-type CB's as a new sports car is from the Model-T.

CB, yesterday and today Modern, solid-state transceiver at right

In recent years the use of Citizens Band two-way radio has skyrocketed particularly since TV coverage of the gasoline shortage and truckers strike in late 1974 brought CB to the attention of the public. After the strike, truckers found CB radio was ideal for passing road condition information along the highways and it helped make the long driving hours less tedious. If you do any highway traveling you may have noticed the great number of "18 wheelers" that now have "ears" (CB radio antennas).

CB-equipped truck

The gasoline shortage had another effect on the growth of CB. Many businesses realized two-way radio could save them time and money by reducing wasted travel. Delivery services, salespeople, repair and maintenance companies, and other businesses found CB useful for keeping in touch with their offices and a great aid to planning their routes more efficiently. Large companies, as well as small, were learning that they could be "radio dispatched" without the much greater expense of special business band radio equipment.

Some Basic Information

Later on in this chapter we'll outline some typical applications for CB radio. Undoubtedly you'll be able to think of many more to fit your own particular needs.

In the following chapters we'll give you more detailed information on CB radio equipment, DOC rules and regulations, licensing and operations, but for now let's just outline the basics:

Any Canadian citizen, male or female 18 or more years of age is eligible to apply for a licence.

Getting a CB licence is actually easier than obtaining a driver's licence. No technical knowledge is required. Applicants do not have to pass any test or examination. A CB licence costs $13.50 and is good for 3 years. ***The licence must be in your possession before you are authorized to begin operating.***

CB licence applications are included with all Realistic CB radio equipment sold by Radio Shack stores and dealers, or you may obtain an application by writing the DOC office in your area. Chapter VI has more information in licensing and regulations.

The equipment you will need for CB operation is explained in the next chapter. Basically, it consists of the two-way radio itself, a microphone or handset, and an antenna. The two-way radio is a combination transmitter and receiver — the **trans**mitter section for transmitting or sending a radio signal, and the **receiver** section for receiving or hearing radio signals from other CB radios. This combined transmitter and receiver is known as a **transceiver**.

Transceivers which are normally installed in cars, trucks, boats, planes and other vehicles are known as mobile transceivers. Those which are usually used in homes, offices or other fixed locations are called base station transceivers. One other type of CB transceiver is the hand-held portable, or walkie-talkie.

Walkie-talkie, base and mobile CB sets

Typical Applications

Once you begin using CB you'll find many ways in which it can make your life easier and more fun, as well as save you time and money. You'll probably wonder how you ever got along without it!

Personal and Family. Use CB to keep in touch between your car and home while running errands or driving to and from work. Save extra trips by being able to let your husband know that you need extra groceries; let your wife know you're tied up in traffic and will be home late; call your wife while she's on her way home from her bridge club to tell her Junior needs a ride home from basketball practice.

If you're a two-car (or more) family, CB is great for keeping in touch between cars, or contacting members of the family while they are in their cars—you might even get a chance to talk to your son or daughter this way!

Ever have car trouble far from home, late at night, in rotten weather? With CB you can get help without even getting out of your car. Even if your battery is too low to turn over your engine, you can still call for help—modern solid-state CB radios require very little power from your battery!

Business Use. Call your office to get your messages via CB. Save time and trips by being able to tell field employees of other calls to make. Keep in touch with executives traveling between offices or on the way to meetings. Car-to-car communications are always a convenience and often a necessity in business. Call your associate to let him know you need the contracts he has with him to close a million dollar deal! ...or to let him know it's his turn to buy lunch and you'll meet him at Joe's Grill.

Sales and Service. Two-way radio communication is practically indispensable for any service-type business. With CB you can save time and money—provide more efficient service to your customers. Salespersons can plan their calls and avoid having to double back over their routes. How many times a day do you drop 20¢ into a pay phone to call your office? Three times? Five? More? Those coins quickly add up—not to mention the time and trouble spent looking for phone booths—and getting a parking place.

Doctors and Nurses. Keep in touch with your office, hospital or a particular patient. No need to call in to an answering service to get messages, just pick up your microphone and get them instantly. No delay on important calls either! CB can literally be a real life-saver when used by members of the medical profession.

CB is widely used by security police.

Security Police. A CB communications system can be installed in your patrol cars, and walkie-talkies provided for foot patrolmen at a fraction of the cost of other radio communications systems requiring special licensing. Two-way radio in this profession is not just a convenience, it's a must for both safety and efficiency.

In many cities around the country, neighborhood Citizen Patrols use CB radio to call for police assistance and to communicate between volunteers patrolling in cars or on foot to report any suspicious or criminal activity. These volunteer groups of concerned citizens have been instrumental in many areas in effectively reducing the crime rate.

Truckers and Deliverymen. Truckers are already aware of the value of CB radio on the highway as a means of learning of road and traffic conditions and obtaining assistance in locating destinations. Local truckers and delivery men can use CB to an even greater extent, especially when it comes to finding an address in an unfamiliar area. Radio dispatched delivery vehicles save time and money too!

Farmers and Ranchers. Citizens Band radio is ideally suited to the communications needs of farms and ranches. In some cases it is the only possible means of communication in areas where telephones are inaccessible. A mobile unit on a jeep, truck or tractor, or battery-operated portable equipment for use on foot or horseback can be a tremendous help in the day-to-day operation of a farm or ranch.

Construction Crews. A CB communications network can be set up

almost instantly on any construction site and has far more versatility and flexibility than wired systems of intercoms or field telephones. Again, CB can save you time and money! Whether you're calling for additional materials or coordinating the activities of various work crews, two-way radio communication quickly pays for itself.

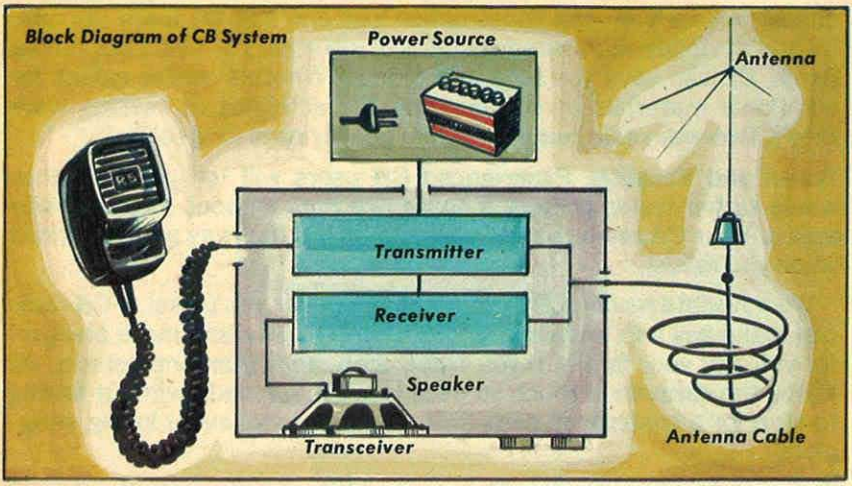
Travel and Vacation. Experienced CB users will tell you that they would rather travel without a spare tire than without their two-way radios. Your CB radio can get you help on the highway and directions when you're lost.

We advocate having CB in your car whenever you travel. A CB radio can make any trip, anywhere in the country, safer and more pleasant for you and your family. If you travel with more than one vehicle, CB keeps the caravan in touch so decisions can be made without having to stop for a conference each time, and helps you avoid losing stragglers.

Camping, Hunting, Fishing. The great outdoors is a great place to use CB walkie-talkies in particular. CB is about the only way you can keep in touch in the wilderness (unless you want to go back to smoke signals), or even in city parks. It's ideal between campsites, hunting parties, hiking groups, fishing boats and boat-to-shore.

These are just a few of the things for which CB two-way radio can be used. You can probably think of many more for your own business, family or personal needs, perhaps even some which would aid your community. So now that you know what you can use CB for, let's look at what you need to use CB.

CB adds to camping safety and enjoyment



II. Parts of the System

The pieces of equipment which make up a complete two-way CB radio station are really quite easy to understand and use. Actually, you can hold everything needed for two-way communications in one hand (that's known as a walkie-talkie!) and you'll learn more about that later in this chapter. For now, let's look at an overview of the typical CB station.

The heart of your two-way radio system is the transceiver. This, as we've mentioned earlier, is a combination transmitter and receiver. Connected to the transceiver is a microphone into which you talk, and built into the transceiver is a speaker through which you hear other stations. The transceiver is also connected to a source of power—either 120 volts AC, a 12 volts DC car battery or self-contained batteries—and to an antenna which serves both to radiate transmitted and receive incoming radio signals.

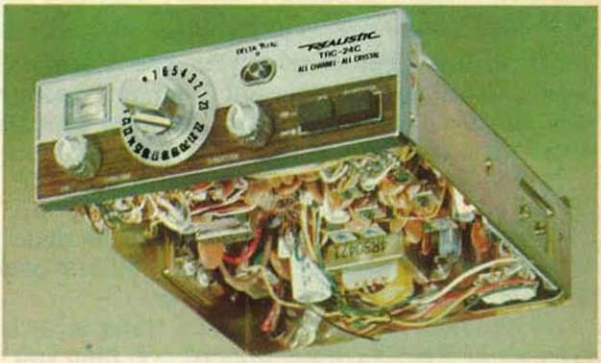
Transceivers

CB radio transceivers are truly remarkable examples of modern technology. Solid-state circuitry makes it possible to produce two-way radios that are a fraction of the size and weight of older tube-type equipment, considerably more reliable, longer lasting, and which require far less current to operate—an expecially important feature

when you are powering your CB radio with your car battery!

Transceivers are made up of several separate but interconnected circuits, some of which are shared by both the transmitting and receiving functions of the set. Basically, the transmitter circuit converts the sound waves you produce by speaking into the microphone into electrical energy which is then sent out through the antenna as a radio signal.

The receiver circuit essentially reverses this process: the radio signal coming in through the antenna is electrical energy which is amplified and goes to the speaker where it is converted into mechanical energy (sound waves) which you then hear as a voice.



Inside view of mobile CB transceiver

Base or Mobile

CB transceivers are usually divided into two classes—base station and mobile station. The difference is typically determined by whether the set will operate on 120 VAC or 12 VDC, and by the size of the transceiver.

This can be misleading since many "base station" transceivers can operate not only on 120 VAC but also on 12 VDC, and often are supplied with mounting brackets for mobile installation. They can also be used in marine applications, for recreational vehicles, and, in an emergency, if the AC power fails, they may be operated from a battery.

On the other hand, "mobile" CB radios are generally much more compact than "base" radios and are equipped for operation only on 12 VDC. To use a mobile CB radio as a base station you would need a power supply which converts 120 VAC to 12 VDC.

Confused? There's no need to be. Look at it this way—in selecting

Power supply for base station use of mobile transceiver

a CB radio you decide what your needs are and choose your equipment accordingly. Do you want a compact, easily mounted radio primarily for use in your car? Then you want a mobile transceiver which, should you wish to use it as a base station occasionally, will require a power supply that converts 120 VAC to 12 VDC, as mentioned above.

If you plan to operate primarily from your home or office, you should use a transceiver which has a built-in power supply for use on 120 VAC—a base station transceiver.

In addition, if your base station transceiver is of the base/mobile type, as all Realistic base stations are, then you can also use it when the need arises as a mobile or marine station operating on 12 VDC. A radio of this type is especially useful in motor homes where you can use the DC power on the road and the AC power when you stop and hook-up or have your AC generator running.

Power Sources. While we're on the subject, let's look at the types of power that can be used to make your CB set operate.

120 VAC. This is standard house current. The number is sometimes written differently (i.e. 110, 115, 117, 125,) but in any event it is the alternating current which comes from the wall outlets in homes and offices throughout the country.

If your CB transciever is designed to operate on AC, it will be equipped with a plug just like that on your TV, radios and other electrical appliances. NEVER ATTEMPT TO CONNECT A MOBILE CB RADIO TO 120 VAC BY INSERTING THE POWER WIRES INTO AN AC OUTLET. This will result in damage to the set.

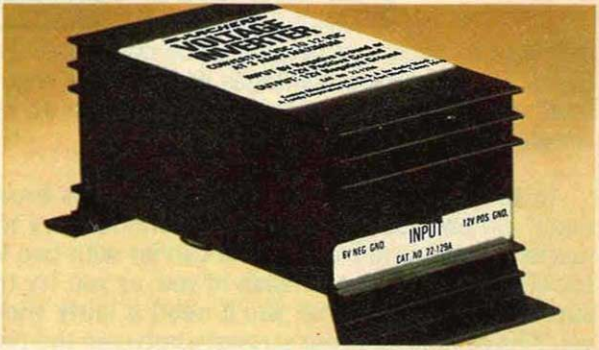
12 VDC. This is the type of battery power found in most cars,

trucks, boats, and other vehicles. It is usually taken to mean "negative ground," that is, where the negative, or "minus" side of the battery is connected to the vehicle chassis or frame.

CAUTION: Some trucks, foreign cars and older American cars were made with a positive ground electrical system—where the "plus" side of the battery is connected to the vehicle chassis. In some cases, older vehicles will have a 6 VDC electrical system. If you aren't sure, ask any mechanic!

Although many CB transceivers are designed to operate on 12 VDC negative or positive ground (check your owners manual), some can only be used on 12 VDC negative ground.

If your vehicle is positive ground or has a 6 VDC system you will need a "DC voltage inverter." This is a device which changes 12 VDC positive ground to 12 VDC negative ground, or steps up 6 VDC negative ground to 12 VDC negative ground.



Voltage inverter for use with 6 VDC or 12 VDC positive ground systems

AM or SSB

AM, AM/SSB. Another distinction between types of CB transcievers is whether they are designed to operate in just the "AM" (amplitude modulation) mode or both AM and "SSB" (single sideband). The majority of CB radios in use today are designed to operate on AM only, and most transceivers which may be used on SSB also have the capability to be used on AM. You can not communicate across modes, that is, an AM only station will be unable to communicate with a station operating in the SSB mode.

Both AM and SSB are terms describing methods of conveying voice information on a radio signal. AM is the method used by standard broadcast radio stations, those you listen to on your ordinary car, home or portable radio. Single sideband is the latest and most effic-

The sidebands on an AM signal may be compared to pushing two carts down a supermarket aisle.

ient way to send and receive voice communications on the Citizens Band. The primary advantages of SSB over regular AM communications are greater range and more channels to choose from. In very simple terms, here's how it works:

In AM transmission, a "carrier" signal is broadcast with a "sideband" on each side of it. Both sidebands carry the same voice information. Imagine yourself as the carrier with two loaded grocery carts (sidebands), one on each side of you, as you try to push them down a supermarket aisle. First, you'll need a fairly wide aisle and, second, you'll have to divide your strength between the two carts.

Now remove one cart, step to the side of the aisle and get behind the remaining cart. You now need only a third of the space you needed before, and you can concentrate all your strength on pushing a single cart. Thus SSB eliminates the carrier and one of the sidebands. It is then able to put all its power into the remaining sideband which effectively triples your power over an AM signal.

This is why AM sets are rated at 4 watts output power and SSB sets are rated at 12 watts PEP (peak envelope power) output. PEP is a measurement of the peak power output of the transmitter and corresponds to the peak of the voice signal. This tripled effective power

SSB is like pushing on a single grocery cart down the aisle.

and narrower signal makes SSB transceivers reach out farther.

In addition, since you can also select either the upper or lower sideband to operate on, SSB increases the number of channels available to you. Instead of just 23 AM channels to choose from, with an AM/SSB transceiver you also have 23 lower sideband channels and 23 upper sideband channels, or a total of 46 additional channels on which to communicate.

It should be mentioned, however, that SSB does have two drawbacks in comparison to AM. First, it's more complex in circuitry and costs considerably more money. And secondly, SSB requires the use of an added control—called a clarifier (explained later in this chapter)—and thus is slightly more difficult to use.

Controls

Knobs, Dials, Switches, Buttons and Indicators. When you have your transceiver connected to an appropriate power source (and your licence in your possession), you are ready to operate it—provided you've read the manual and know what to turn, flip, push or slide. Actually, the controls on a CB two-way radio are no more difficult to use than those on a television set or your car radio.

Almost every CB transceiver has the same three basic controls — OFF/VOLUME, SQUELCH and a CHANNEL SELECTOR. Additional controls, if any, vary from one model to another. The owner's manual supplied with your CB radio will explain the added controls or features built into your particular set.

OFF/VOLUME Control. This is just like the control on radios and TV's. It turns on the transceiver and adjusts the loudness of the sound. On some CB sets there is a separate POWER button to turn the set on and off. This way you can leave the VOLUME control set at the desired listening level instead of having to readjust it each time you turn the radio on and off.

SQUELCH Control. The SQUELCH control eliminates background noise while you are listening for calls, or "monitoring" your CB radio. Normally, this control is adjusted ***just to the point*** where it silences the receiver. If adjusted past this point, it effectively reduces the sensivity of your CB receiver, allowing only stronger signals to be heard.

This can be a handy feature, for example, when two or more vehicles are traveling close together. By adjusting the SQUELCH to its full "on" position, only signals from the nearby vehicle will be strong enough to "break through" the squelch circuit and be heard.

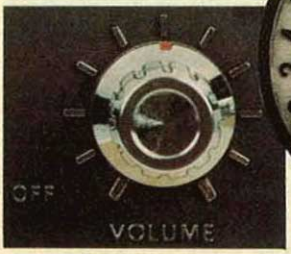
CHANNEL SELECTOR Switch. The CHANNEL SELECTOR on your CB transceiver serves the same purpose as the channel selector on a TV set — it changes from one channel to another. With a TV, of course, you just ***receive*** the station on the channel you have selected. With your CB radio you ***receive and transmit*** on that channel. To talk to another CB station, both transceivers must be switched to the same channel.

Most CB transceivers today have full 23 channel capability. This means that the CHANNEL SELECTOR has 23 numbered positions allowing you to operate on any of the 22 channels presently allocated to the General Radio Service.

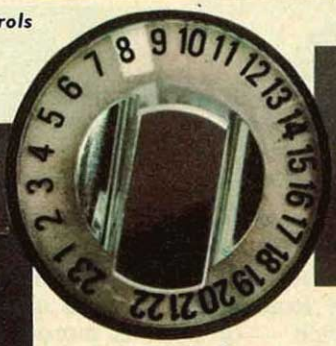
There are also some CB radios available with less then 23 channels. These units are ideal for uses where you need only a few channels for your communications requirements; they are considerably lower in cost the 23 channel sets.

If, for example, you only want a CB transceiver in your car in case of an emergency, or to obtain directions while traveling, a 3-channel radio could be equipped with crystals for channel 9 (national emergency and highway assistance channel).

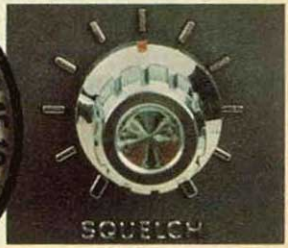
Basic CB Transceiver Controls



Off/Volume



23-Channel Selector



Squelch Control

6-Channel Selector

Power Button

3-Channel Selector

Usually, transceivers with less than 23 channels have their CHANNEL SELECTOR control (or switch) marked with letters of the alphabet. You determine which channels they will represent by installing crystals for the channels you want. (We'll talk more about crystals later in this chapter.)

Microphone with PTT Switch

Indicator Lamps

PUSH-TO-TALK (PTT) Switch. This is another control that every CB set has in common. However — except for walkie-talkies — it is not located on the transceiver itself. This is the transmit/receive switch which is conveniently located on the body of the microphone. The transmit/receive switch — or as it is more commonly called, the PUSH-TO-TALK button — does exactly that: you push the button to transmit, release it to receive.

MODULATION Lamp. A MODULATION lamp may be either a small pilot-size lamp or a larger indicator with or without the word "modulation" on or near it. This lamp flashes as you speak, or "modulate," your radio signal. Modulation is the process of adding voice intelligence to your signal.

The brightness of the lamp is directly proportional to the percentage of modulation (the amount that your voice fills your signal — ideally as near 100% as possible). In this way it gives you an indication that you are getting maximum "talk power" from your transmitter. Some base station transceivers also have an ON-THE-AIR lamp which simply serves to indicate that the radio is in the "transmit" mode as opposed to the "receive" mode

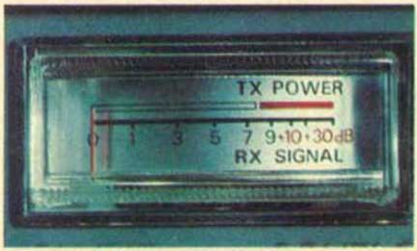
S/RF Meter. An S/RF meter serves a dual function. When the transceiver is in the receive mode the meter indicates the strength of the incoming signal. In the transmit mode the meter shows radio frequency (RF) transmitter power output.

On some CB sets the modulation lamp is also built into the meter and functions as described above. Some deluxe CB stations also have an SWR meter. This meter provides an indication of how well matched the antenna is to the transceiver.

ANL Switch. Most CB radios have an ANL (automatic noise limiter) circuit. On some this circuit is an integral part of the unit and is always "on". Other transceivers have an ANL switch which permits you to switch it out of the circuit for slightly better sensitivity when noise reduction is not necessary. The ANL helps reduce noise or interference such as that caused by auto ignition systems.

NOISE BLANKER Switch. A NOISE BLANKER is another, more sophisticated circuit which serves to reduce noise from auto ignitions and other sources of electrical disturbance. It is sometimes used in addition to an ANL for even more effective elimination of interference.

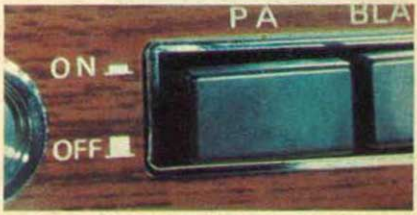
PA Switch. The PA (public address) switch adds an extra feature to many CB transceivers. When this switch is in the PA position you can use your CB Radio, through an external speaker, as a public address system. With some units you can still receive CB calls while using the PA function.



S/RF Meter

Automatic Noise Limiter

Noise Blanker



Public Address Switch

Delta Tune

RF Gain Control

DELTA TUNE Switch. The DELTA TUNE switch serves as a "fine tuning" control. On some transceivers it is in fact identified as a FINE TUNING control. If you are receiving a signal which is slightly off frequency (doesn't sound clear) you can use the DELTA or FINE TUNING control to tune slightly off frequency for better reception. This control is also useful in helping to reduce adjacent channel interference caused by another station operating slightly off frequency on an adjacent channel.

RF GAIN Control. The RF GAIN control may be used to adjust the sensitivity of the circuitry which amplifies incoming signals in your receiver. This can be advantageous when receiving strong signals from very nearby stations which may "overload" your receiver causing a distorted signal. It can also be used to reduce interference, in crowded signal areas, from weaker stations in the background.

The controls we've described so far are fairly standard regardless of whether your transceiver is a base or mobile unit, and regardless of whether it is an AM or AM/SSB unit. In addition to those controls already described most AM/SSB transceivers have two more controls not found on AM only transceivers.

Clarifier Control

AM-LSB-USB Switch

AM-LSB-USB Switch. This control is used to select the mode of operation for both the transmit and receive sections of the transceiver. In the AM position you transmit and receive in AM. In the LSB

position both the transmitter and receiver sections of the transceiver operate on the lower sideband portion of the channel; in USB on the upper sideband portion.

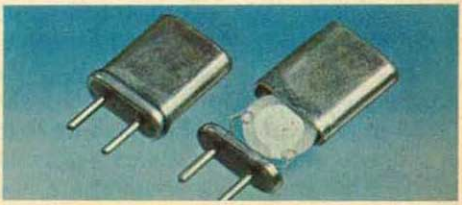
CLARIFIER Control. The CLARIFIER control is very similar in function to the DELTA or FINE TUNING control. Especially important for SSB operation, it allows you to tune the receiver frequency slightly so that you are receiving the station you are listening to exactly on frequency.

It's called a clarifier because on an SSB signal it really does "clarify" reception. Without it, if the station you're receiving is not precisely on frequency, what you would hear would sound much like an unintelligible Donald Duck, or an equally undecipherable growl.

The Back of the Box. The rear panels of most CB transceivers are pretty much the same. The power cable, or a plug to which the power cable is connected, is located on the rear panel. There is also a connector to which the antenna cable is attached. Some units have a jack which permits you to connect an external speaker if desired. If the CB set has a PA facility, the jack for the external PA speaker is also on the rear panel.

Crystals. Crystals are the precise frequency-determining devices which cause your CB transceiver to transmit and receive signals in

Your transceiver's rear panel has the connections for power, antenna and external speakers.



Crystals are precision-made to assure you of exact frequency operation.

exactly the right spot in the radio frequency spectrum. It is the crystal frequency that determines what channel you are operating on.

At one time it was necessary to have a transmit crystal and a receive crystal for each channel you wanted to use — 46 crystals for full 23-channel operation. Today, through the use of circuits called ***frequency synthesizers,*** nearly all 23-channel CB radios come completely equipped with crystals for all channels. This is now done with 14 to 16 crystals. These crystals are multiplied and divided together to provide 23 channels without the expense and extra space required by 46 individual crystals.

The latest advance in frequency synthesis circuits is called ***digital frequency synthesis.*** This circuit, combined with ***phase lock loop*** circuitry, makes it possible to mathematically derive all 23 (or even more) channels with a greater degree of stability than previously possible, using only one or two crystals!

Transmitter Power. Radio power is usually described in terms of ***output,*** the power actually being sent to the antenna, or as ***input*** power, the power applied to the transmitter circuit which will result in a percentage of this figure as the actual power output to the antenna. For example, a circuit operating with 70% efficiency may have an input power of 10 watts while its power output would be 7 watts.

The transmitter power output on your CB radio is limited by DOC regulations to 4 watts on AM and 12 watts PEP (peak power) on SSB. What do we mean by "watts of power?" Think of ordinary light bulbs. A 15-watt bulb gives more light than a 7-watt light bulb. A 60-watt bulb more than a 15-watt, and a 100-watt bulb gives more light than a 60-watt bulb. Obviously, the more wattage the more power.

Although the 4 watts maximum allowed for your AM transmitter may not sound like much, especially when you consider a 50,000 watt broadcast station, this power is really quite sufficient for CB communications.

Walkie-Talkies

A walkie-talkie is a portable, hand-held CB two-way radio with its own built-in power source (batteries) and built-in antenna. Operation of the controls is just like any regular CB set, with the major difference being that the transmit/receive push-to-talk switch is on the side of the walkie-talkie case instead of on an external microphone.

There are walkie-talkies available, like Realistic's TRC-101B and TRC-100, that have about the same transmiter power as a full CB

radio; and the TRC-101B even has full 23-channel operation! Other units operate at lower power and have from 1 to 6 channels.

Walkie-talkies are not limited to use with other walkie-talkies. They also work with base and mobile CB stations. A DOC licence is required if the walkie-talkie has a power input of over 100 milliwatts (mW). 100mW is one-tenth of one watt.

100 Milliwat Walkie-Talkies.

100 mW walkie-talkies can be fairly sophisticated units with many of the features of higher power sets including more than one channel operation, call signals, squelch controls and provision for use of external power sources. Or, they may be very basic "toy" models with minimal features.

The range of these licence-free walkie-talkies, due to their very low power, is fairly limited. However, for many purposes they are excellent and can be used to provide efficient wireless communication. For example, they are ideal for many outdoor activities: boating, camping, hiking. The "toy" walkie-talkies will keep youngsters occupied for hours on end, indoors or out.

Full-power 23-channel walkie-talkie

2 and 3 channel walkie-talkies

100 mW "toy" walkie-talkies

Antennas

The antenna you use with your CB radio is just as important as the radio itself. No matter how good your transceiver is, it will be of little value without an antenna.

An antenna is basically a metal structure designed to radiate and receive radio signals. The design is such that the antenna is "resonant" at the particular frequency for which it will be used so that it will perform with optimum efficiency.

When we refer to an antenna as resonant, this simply means that its size and shape are such that it will operate best at the frequency (in this case, CB's 27 MHz) we desire. For example, in tuning a musical instrument, a tuning fork may be used. The tuning fork is designed to be resonant at a particular frequency, say middle C. When the guitar, piano or other instrument being tuned is tuned to match the note from the tuning fork, the tuning fork and instrument are in resonance.

Just as there are base and mobile transceivers, there are specific antennas designed for base and mobile use. The major difference in design between base and mobile antennas is, of course, size. Generally, the larger the antenna the more effective it will be. Obviously the size of a mobile antenna is limited, while base station antennas can be considerably larger and more elaborate in design.

Base Station Antennas. The most popular type of antenna being used for CB base stations today is the "ground plane" antenna. Any antenna requires a ***ground*** to operate. With some antennas this is accomplished with a physical connection into the earth. A mobile antenna uses the car's body to serve as the ground.

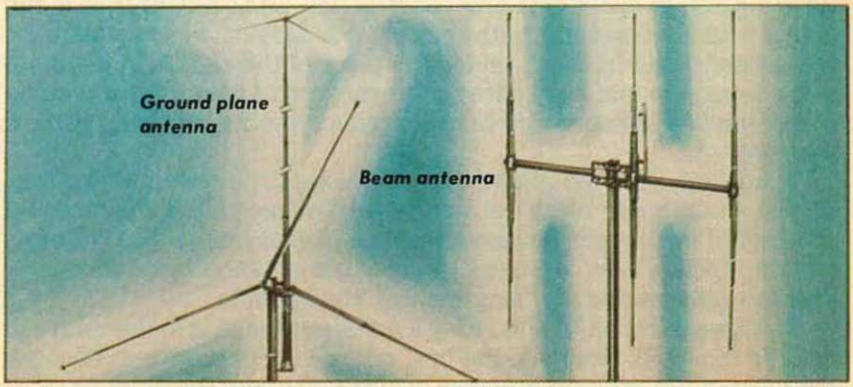
Since this ground is needed, yet you want to raise your antenna above actual ground level, a means is needed for bringing "ground" up to the level of the antenna. This is where the ground plane antenna comes in.

A ground plane antenna is designed with an upright or vertical element known as the ***radiator,*** and several horizontal elements called ***radials*** at its base. These radials serve as an artificial ground, thus permitting the antenna to be installed at any height above the actual ground itself.

Ground plane antennas are ***omnidirectional.*** That is, they radiate and receive radio signals equally well in all directions. They can also be designed to provide an increase in effective signal power. This is called ***gain.***

Radio Shack, for example, manufactures ground plane antennas under their exclusive Archer brand name described as ¼-wave, ½-wave and 5/8-wave. These sizes refer to the actual physical size of the antenna in relation to the electrical size of the frequency they are designed for (in this case 27 MHz).

Using the ¼-wave as a reference standard for measuring purposes, a ½-wave gain-type ground plane antenna increases the effective radiated power (ERP) of the transmitted signal nearly 2½ times. With the 5/8-wave antenna ERP is increased even more so that a 4-watt AM signal goes out with an ERP of about 12½ watts.



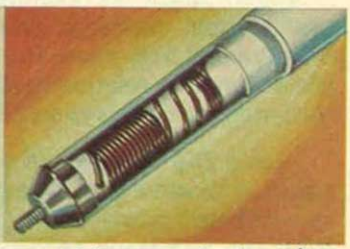
The most effective, or powerful, base station antenna is a ***beam*** antenna. As the name implies this type of antenna "beams" or points the signal in a specific direction. Its design is similar in appearance to a TV antenna.

A beam antenna provides the greatest gain of any type of CB antenna, however, this is limited to one direction only. If your beam is pointing East, you will send and receive extremely well in this direction and poorly in other directions.The gain from Radio Shack's Archer "Crossbow" beam antenna is such that the power from this antenna (in the direction it's pointed) becomes equivalent to about ***85 watts of power.***

Unless you are going to be communicating between the same two fixed points at all times, an antenna rotator should be used with a beam antenna. A rotator allows you to point the antenna, by means of a remote control box, in any desired direction.

Control box

Antenna rotator

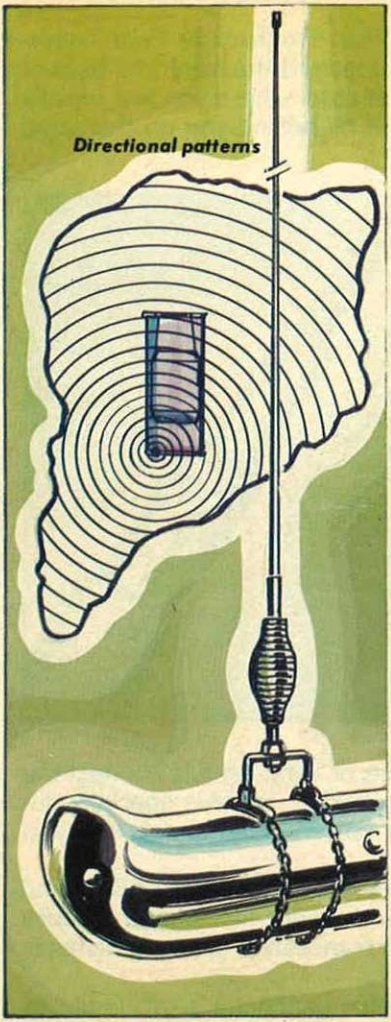


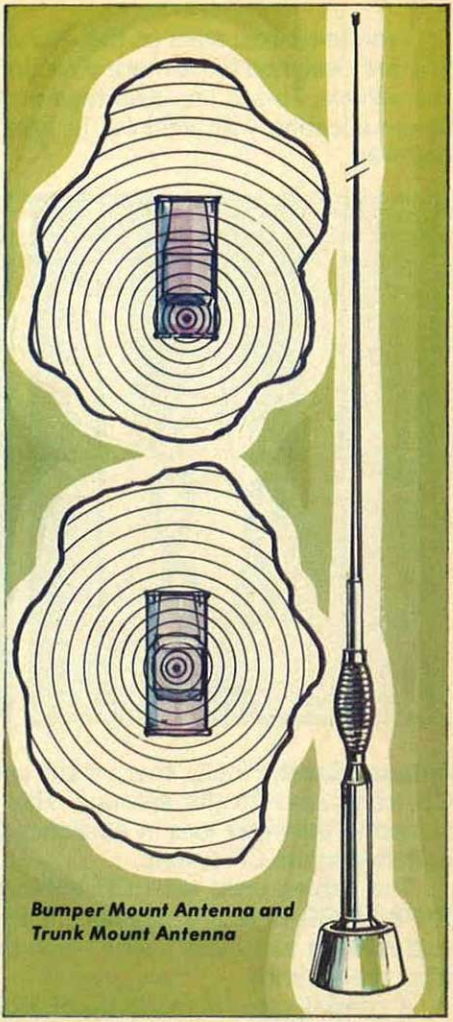
Mobile antenna loading coil

Mobile Antennas. Most CB mobile antennas are pretty much alike, differing only in minor details of construction. The similarity lies in the use of a vertical element, with the car body serving as the ground for the antenna and, in effect, taking the place of the radials in a ground plane type antenna. They differ in the method of mounting and in the use of ***loading coils*** in some cases to reduce the length of the vertical element.

A full-size CB whip antenna is 108" long (102" whip, 6" spring). This is an optimum electrical size for resonance on CB channels. An antenna of this length, however, may not always be practical. For this reason, leading coils are used to allow the antenna to be physically shorter while electrically "lengthening" the antenna.

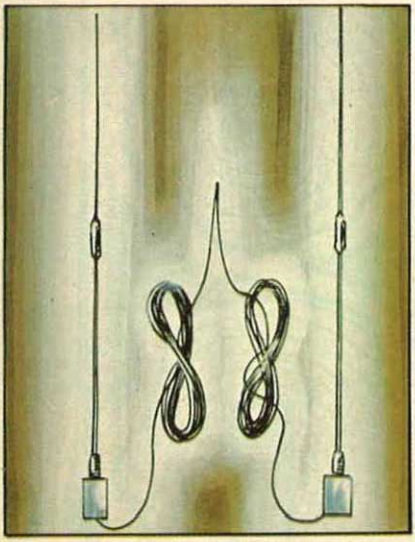
The ideal location for mounting a mobile antenna is in the centre of the car roof. This results in the best omnidirectional pattern because the mass of the car body is evenly distributed under the antenna.

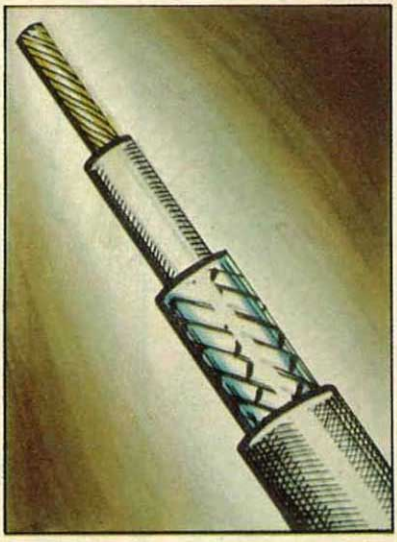




Although CB mobile antennas are designed to be omnidirectional, their location on the car body will tend to make them slightly directional, usually toward the greatest area of the car. For example, an antenna mounted on the left rear fender will be slightly more directional toward the right front fender.

Twin antennas, such as the Archer Twin Truckers, or Twin Trunkers, are designed to be more directional toward the front and back of the vehicle. This is an advantage on the road where you are usually communicating with vehicles in front of or behind you on the same highway.





Antenna Cable. Finally, there is the cable, or wire, used to connect the CB transceiver to the antenna. This "coaxial" cable is specially designed to minimize loss in efficiency or power. Like the antenna, it is matched to the CB system.

The cables used with CB antennas are know as RG-58/U and RG-8/U. RG-8/U is a heavier cable with lower loss characteristics that make it especially useful when the transceiver is a long distance from the antenna.

A coaxial cable is made up of a centre conductor surrounded by low-loss insulation, which is in turn surrounded by a braided shield which serves as a second conductor. Radio Shack stores sell coaxial cables with the correct connectors already fastened to each end. This design aids in minimizing signal loss, as well as helping to prevent pickup of interference from electrical devices and auto ignition systems.

CB keeps you in touch

and on course

III How Far Can You Talk?

Now that you know what CB radio is all about—what you need in the way of equipment and how you can use it for your own business or personal communications needs—the question that has probably come to mind is "How far can I talk?". It would be convenient if we could simply say that mobile-to-mobile your range will be 5 to 15 miles, from a base to a mobile 10 to 25 miles, and between base stations 15 to 30 miles.

Actually, as an average, these figures are fairly reasonable. Under some circumstances, however, the range of your CB equipment may be considerably more or considerably less. If all CB stations were operated in wide open flat country with no obstructions from hills, trees and buildings, and if atmospheric conditions and weather did not change from day to day, it would be fairly easy to tell you exactly how far your CB set would reach.

Since this is obviously not the case, and CB stations are used in all parts of the country under every type of weather condition and with other variations from station to station, it would be impossible to state with any degree of certainty exactly what your range will be.

We can, however, in the next few pages, give you some idea of the factors which will influence the distance over which your CB radio will operate so that you will be aware of what they are and what you can expect in the way of communications.

CB Is Excellent for Most Local Applications

Citizens Band radio is, as we've mentioned before, for short-distance communications. Although under "skip" conditions it would be possible for an ordinary CB radio set to send and receive signals between Toronto and Montreal, according to DOC regulations CB may not be used for distances greater than 30 miles.

In more practical terms, the effective range of your CB radio will depend upon several factors: quality of your transceiver and antenna, antenna height, terrain over which you are communicating (flat and level, water, hilly, city with buildings and other obstructions), and atmospheric conditions. We'll discuss these (with a minimum of technical "gobbledygook") in the following pages.

The area you might want to communicate over could be an entire small town or city, most or all of a medium size city, a portion of a large

city or an entire ranch or farm. You will be able to communicate with trucks or other vehicles which are nearby or even several miles from your car when you're on the highway (depending upon whether the road is straight or winding, hilly or flat, etc.).

By selecting good quality equipment, such as Realistic-brand two-way CB radios and Archer antennas, your CB station will provide you with consistently reliable communications. The next chapter will give you some examples of typical applications and suggested type of equipment.

Factors Which Affect Distance

Antennas. The performance of any two-way radio system depends to a great deal on the efficiency of its antenna. Since Citizens Band radio uses relatively low transmitter power, the antenna is more important than you might normally imagine. The antenna you use with your CB equipment is as vital as the two-way radio itself—not even the best CB transceiver will work effectively if it is connected to a poor quality antenna.

The use of a good antenna, properly installed and matched to your CB set, and placed as high as physically and legally possible, will do more to increase the range of your communications than a considerable (and illegal) increase in transmitter power.

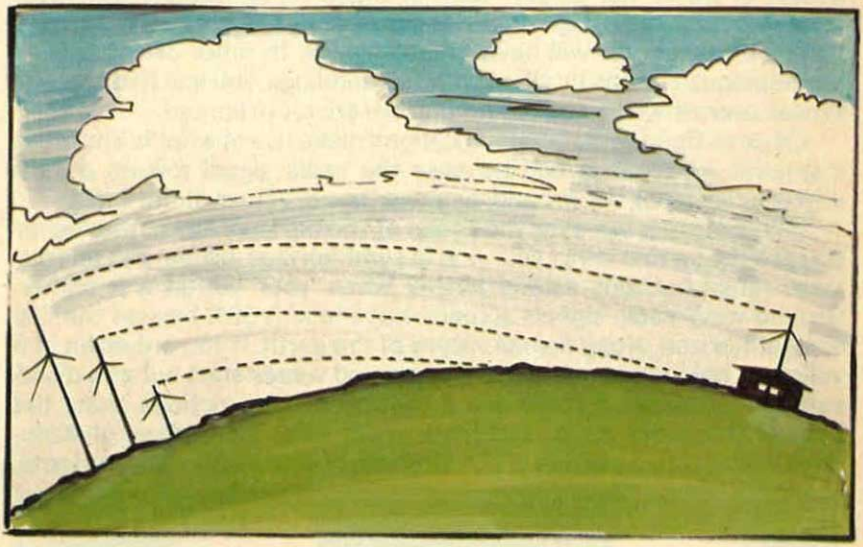
In selecting an antenna for your CB system, a good rule of thumb to go by is simply "get the best antenna you possibly can." Your local Radio Shack store sells a wide variety of antennas under the exclusive Archer brand name. Radio Shack manufactures these antennas to exacting electrical and mechanical standards to provide you with the best performance possible.

If you will need communications capability in all, or most directions, select an omnidirectional (all direction) type of antenna. On the other hand, if most of your communicating will usually be toward one direction from your base, a directional "beam" antenna may be more suitable. With a beam you can "point" your signal where you want it. Most beam antenna installations include an antenna rotator—this is a remotely controlled motor which turns the antenna to point it in whatever direction you wish at any time.

Mobile antennas are nearly all designed to be omnidirectional, although they do have some directional characteristics depending on

how and on which part of the vehicle they are mounted. Size and type of mounting are usually the primary considerations in selecting a mobile antenna.

The most efficient mobile antenna is the full-size 102" whip; or for trucks, a set of twin truckers. Often, however, you may not be able to use a large antenna on your car. As we explained in Chapter II, many CB antennas have been designed in smaller sizes with what is known as a "loading coil" built into them. The loading coil electrically "lengthens" the antenna so it will work properly with your CB radio.



A higher antenna provides greater range

Last, but certainly not the least consideration in respect to antennas, is height. Just as the higher you are above ground the farther you can see visually, the higher your antenna is placed above ground the farther it can "see" radio signals. With a mobile installation you are, of course, limited by the height of the vehicle. With your base station you can (and where distance is important, you should) get your antenna as high as is legally permissible. (See chapter V.)

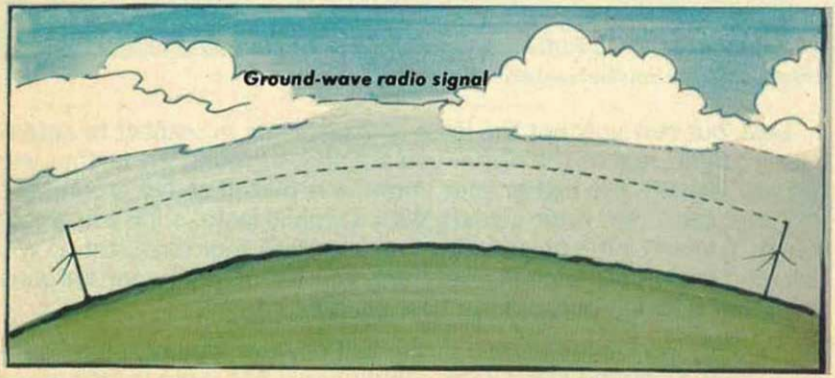
AM or SSB. As we mentioned in the last chapter, one of the advantages single sideband offers over conventional AM radio transmission

is increased range. In situations where you are trying to get as much distance as possible from your CB station you should consider using SSB. In addition to the added range, SSB, you will recall, provides you with twice as many usable channels to operate on—a definite advantage in areas where the CB channels may often be crowded.

Terrain and Obstructions. Another factor which will affect the distances over which you can communicate, and over which you will have little control, is the terrain in your area and obstructions between communicating stations. Hills, trees, valleys, building, mountains, bodies of water, flat plains—each of these configurations will affect your two-way radio signals. In some of these areas, such as over bodies of water, you will have greater range. In other areas, hilly or mountainous regions or cities with tall buildings, you will find the distances over which you can communicate are more limited.

Citizens Band radio communications make use of what is known as a ground wave—so called because the radio signal follows a path pretty much along the ground, or along the curvature of the earth.

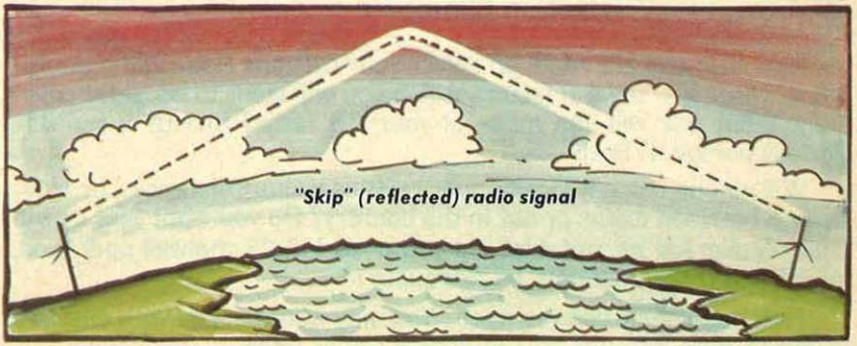
Image looking out over the ocean at the horizon. Again, the higher you are the farther away your line of sight horizon will be, just as your radio range horizons extend farther when your antenna is higher. Ground wave radio signals actually travel about 30% beyond the line of sight horizon, along the curvature of the earth. If you are down in a valley, or behind a mountain, these ground waves start out at a disadvantage. Likewise, if there are a number of obstructions along the path of the radio wave—buildings, trees, hills, etc.—these obstructions will absorb a portion of the strength of your radio signal enroute,



weakening it and thus reducing your effective communications range.

Atmospheric Conditions. Atmospheric conditions, which, again, you have no control over, will affect your CB communications primarily in two ways—interference and skip. Lightning and other forms of atmospheric electrical interference show up as static, often making communications difficult, especially when listening to a weak station. Fortunately, these conditions occur infrequently, and seldom interfere to the extent that communications are seriously hampered.

Skip occurs when your radio signal is reflected back from layers of ionized atmosphere surrounding the earth. This phenomenon is what makes long distance shortwave radio communication possible. The reflected signal comes back to earth a great distance, often hundreds or even thousands of miles, from its point of origin. It is not legal to "talk skip" on CB (remember the 30 mile limit). When skip conditions are present the CB channels may become unusually cluttered with distant stations to the point that they interfere with normal, local communications. Again, however, these conditions occur infrequently.



As you can see, the range possible with your CB radio is determined by a number of factors. Once again, however, let us stress that perhaps the single most important factor which can affect your communications range is your antenna installation. Only by selecting and properly installing the best possible antenna for your CB radio can you be assured of optimum performance and the greatest possible range from your Citizens Band stations.

All things considered, you will find Citizens Band two-way radio suitable for virtually any local business or personal communications need!

There's a CB radio for every need from this basic 3-channel set (at left) to a deluxe 23-channel AM/SSB model (below)

IV. Equipment Selection Examples

Now that you are ready to select your Citizens Band radio equipment, there are several factors which you will want to consider carefully. What use will you make of your CB radio? Strictly business? Strictly personal? Both?

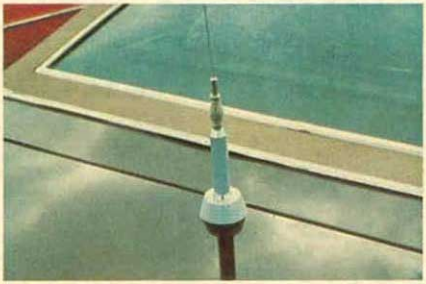
Will you be using it locally, over relatively short distances, or travelling between towns or out in the country? Do you want SSB or will just regular AM be suitable? Do you need full 23 channel operation, or will just three channels be adequate?

How many units will you need? You may want to start with one, two or three, then perhaps add additional radios later.

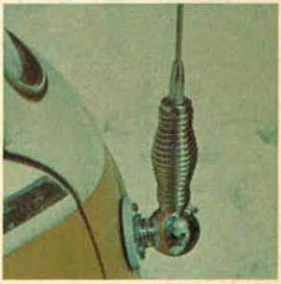
Your CB radios do not have to be identical models, however, they do require common channels and modes—AM or SSB. For example, you might want an AM/SSB 23-channel transceiver in your home or office, and a regular 23-channel AM set in the family station wagon which is used for travelling.

In your second car, which is used primarily for running errands around town, a compact three-channel AM set may be all you need. All you need do is use the same channel with each radio and remember to listen in the AM mode at your base station.

Careful consideration must be given to your choice of an antenna. As we've mentioned earlier in this book, your antenna can make a real difference in how well your CB system preforms. For your mobile station the main consideration is usually the type of mounting—bumper mount, roof mount, no-hole trunk mount, magnetic mount, etc.







Various mobile antennas

In choosing an antenna for your base station you will have to decide whether you want an omnidirectional or directional antenna. If you choose a directional (beam) antenna you should also consider using a rotator with it.

In the following table we will describe typical CB applications and suggest a transceiver and antenna for each. Keep in mind that these are simply a few of the combinations of equipment for use in typical situations. Your actual choice of a transceiver and antenna will depend upon your own needs, budget and personal preferences.

An informed person, such as a Radio Shack salesperson, will be able to suggest specific models best suited for your particular situation.

TYPICAL SITUATION	TRANSCEIVER	ANTENNA	REMARKS/ACCESSORIES
Family use: Home station and two cars. Short distance communication around town, between cars when traveling.	Home: **TRC-55** Cars: **TRC-24C's**	**21-902** ½-wave **21-908** no-hole trunk mount	Full 23- channel capability is especially helpful when traveling to allow use of popular local channels, or for special services (auto repair, motel reservations, etc.)
Highway assistance: For use in car when traveling to obtain aid in the event of car trouble.	**TRC-9A**	**21-930** cowl mount CB/FM/AM	Equipped with channel 9; crystals for two additional channels may be added.
Motorhome: Traveling and vacation use cross country. For highway assistance.	**TRC-48**	**21-942** Twin Truckers II	AD/DC power lets you operate from battery, or AC from generator or camp hook-up, SSB capability gives extra range in remote areas while still providing regular AM operation.
Boating: Boat-to-boat and boat-to-shore communication while fishing, water skiing, sailing, etc.	Permanent Installation: **TRC-24C** Walkie-Talkie: **TRC-35C**	**21-912** marine Built-in	Walkie-talkie for use in smaller vessels where installation is not practical. Equipped with one pair of crystals; two additional channels may be added; rechargeable batteries may also be desirable.

Outdoor recreation: Camping, hiking, hunting, etc.	Base: **TRC-52** Walkie-Talkies: **TRC-35C's**	**21-921** back-of-set Built-in	Use 12-volt battery for base station power.
Ranch or Farm: Base station, vehicles, men on horseback or on foot.	Base: **TRC-55** Vehicles: **TRC-11's** Walkie-Talkies: **TRC-100B's**	**21-1133** 5/8-wave **21-1094** body mount whips Built-in	TRC-11's and TRC-100B's equipped with one pair of crystals; add crystals for up to five more channels.
Service station: With tow truck and/or other service vehicles.	Base: **TRC-30A** Vehicles: **TRC-24C's**	**21-1133** 5/8 wave **21-1094** body mount whips	Full 23-channel capability allows communication with any CB equipped motorist.
Retail store: Any local business with delivery and/or service vehicles.	Base: **TRC-30A** Vehicles: **TRC-11's**	**21-902** ½-wave **21-909** gutter clamp	TRC-11's are equipped with one pair of crystals; add crystals for up to five more channels.
Construction company: From main office to distant job site office; site office to work areas, foreman's jeep; between areas or work crews at job site.	Main office: **TRC-55** Site office: **TRC-30A** Jeep: **TRC-56** Crew Walkie-Talkies: **TRC-100B's**	**21-933** beam with **15-1220** rotator **21-901** ¼-wave **21-1094** body mount whip Built-in	Beam antenna lets main office point signal to job site. Telephone handset of TRC-56 is easier to hear in noisy areas. TRC-100B's equipped with one pair of crystals; add up to five extra channels so crews may communicate simultaneously without interfering with each other.




Typical CB base stations

V. Installation

Once you have selected the particular CB transceiver and antenna which will best suit your CB communications requirements, your next concern will be the installation of your equipment in your home, office or vehicle.

Your CB installation, whether base or mobile, can be as simple or as elaborate as you want to make it. It can be set up permanently or on a temporary, easily moveable basis; custom installed or just placed conveniently.

Just as your choice or equipment may run anywhere from a 23-channel AM/SSB base station transceiver with a beam antenna and rotator, to simply a 3-channel walkie-talkie, your preference in installing your station will also depend upon your personal requirements.

It is not within the scope of this book to provide detailed instructions for custom-installing a home CB station behind a wall or in a decorator cabinet, or built into a desk or easy chair, or directions for in-dash mounting of a mobile two way radio—although all of these are possibilities you may wish to attempt or have done.

What this chapter will do, along with the owners manuals supplied

with your CB transceiver and antenna, is give you the basic information you will need for deciding where and how to install your equipment, and provide instructions for a basic, straightforward base station and mobile installation.

Plan Ahead

Before you begin running wires, drilling holes or putting up shelves stop and think about the total installation. Go over each step of what you will be doing and where you will be doing it. You'll find that planning ahead will help your installation go together easily and efficiently.

Consider each step carefully—take your time—it's no fun connecting the cable to your mobile antenna only to find that you'll have to disconnect it in order to run it through your car.

By now you know that in any CB installation, base or mobile, there are five main elements which must be provided for; the transceiver, the microphone, the antenna, the antenna cable and a source of power for the transceiver.

The positioning and installation of each of these elements must be carefully planned for safety, accessibility, convenience and comfort. Consider the end result before you begin.

Will your base station transceiver be precariously balanced on a shelf where a tug of the mike cable can bring it crashing down? Can your power cord and antenna cable be run neatly, out of the way where no one will be likely to trip over them? Will the microphone be easy to reach and use without being where it will get in your way?

Is your mobile transceiver going to be where it may interfere with

the operation of your emergency brake or gearshift? Can you reach the controls easily? Is the channel selector visible? Will the mike cable get tangled in your steering wheel? Can the power cable be connected securely and positioned so that it can not short out? Is the antenna cable routed where it will not trip the driver or passengers or get tangled in the brake or gas pedal? Will the antenna interfere with opening the trunk?

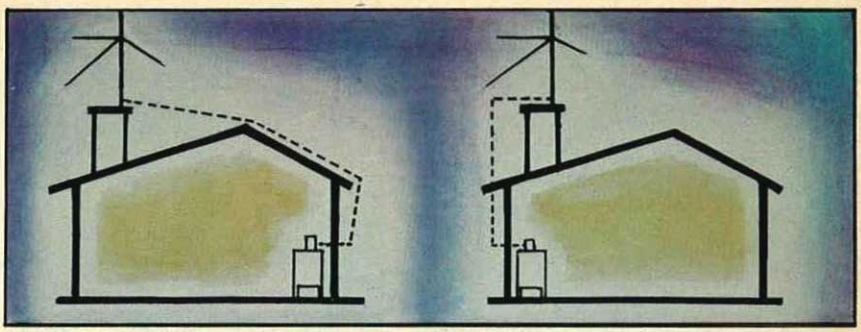
Before you actually mount your mobile transceiver, hold it in place and check carefully to be sure there are no potential problems. Be sure that it will not interfere with the safe operation of your car or the comfort and safety of its passengers. Check to be certain that you will have enough clearance to be able to mount the unit to its bracket and to connect the microphone and antenna.

Setting Up Your Base Station

A base station installation is fairly simple. It is really just a matter of placing the transceiver in the desired location, connecting it to a source of power (usually a 120-volt AC wall outlet), and connecting an antenna. You do, of course, have to install an outdoor antenna for optimum performance.

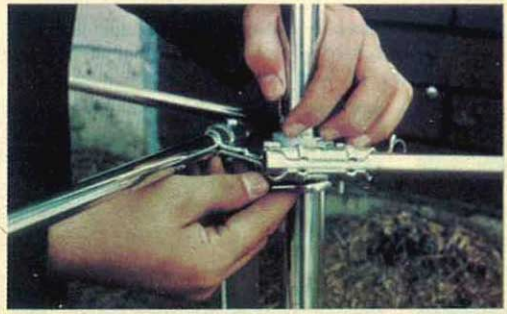
The first step is to decide where you are going to locate your transceiver and where you are going to mount your antenna — and consider each in relation to the other. Again, ***plan ahead.***

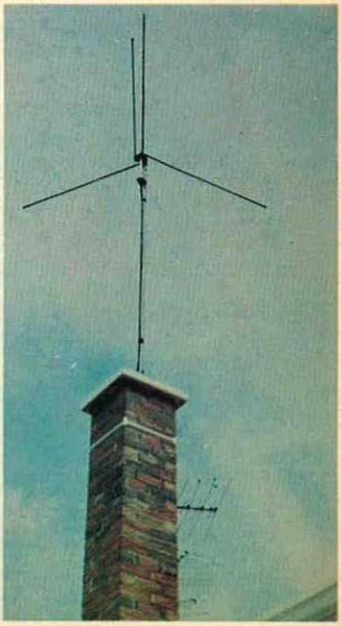
Deluxe CB station with SSB transceiver, scanning monitor and shortwave receiver

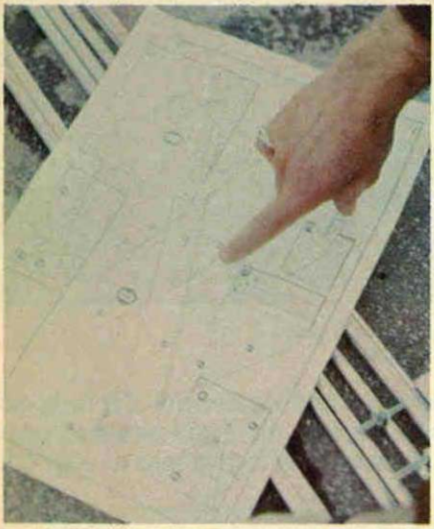


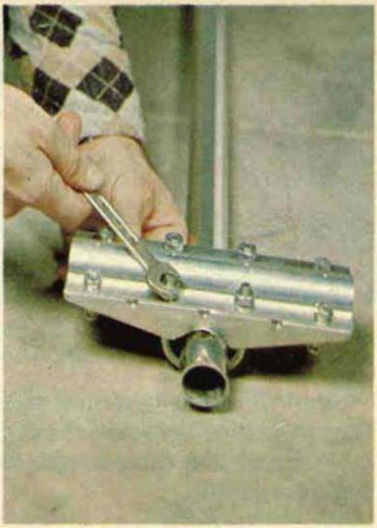
Short, direct cable, as in illustration at right, improves efficiency

You will want to mount your antenna and locate your CB radio so that the cable between them can be kept as short and direct as possible. Excessive cable length can reduce the effectiveness of your CB antenna height.

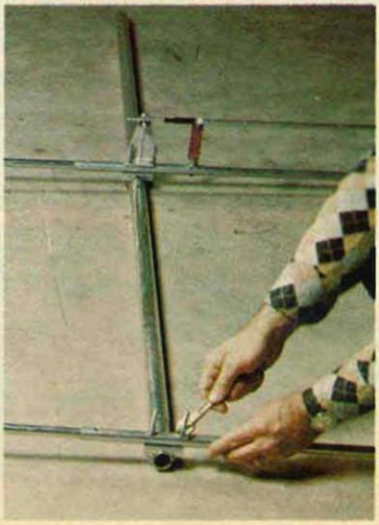


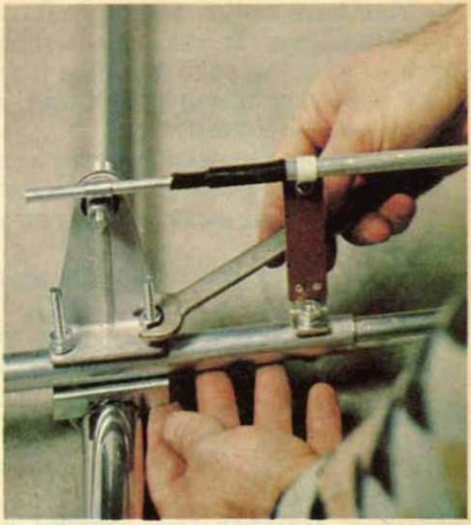




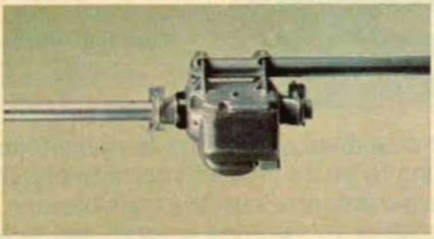


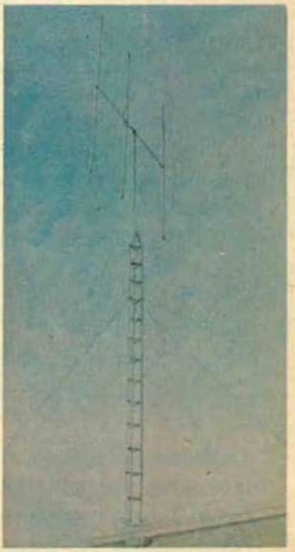
Setting up your base station antenna is not difficult. Follow the directions carefully taking one step at a time. Be sure all hardware is fastened securely ...





... and connections made properly. Mount the antenna so that it will withstand wind and weather.
NOTE: An antenna raising is a great excuse for a party!

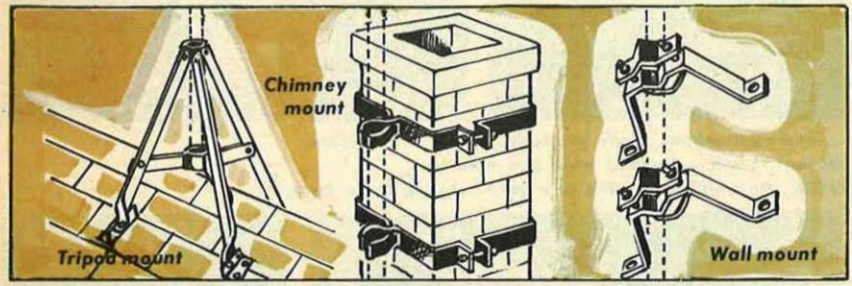




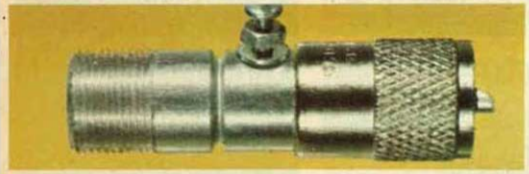
Your base station antenna will have to be assembled before you put it up. Read the instructions supplied with the antenna carefully before beginning. Take your time. It's a lot easier to do it right the first time instead of having to do it over! A word of caution: ***watch out for overhead power lines.***

Everything you need to install an antenna correctly is available at your local Radio Shack store. They manufacture Archer antennas. You can also get some expert advice and suggestions which may save you time and effort.

There are several different ways of mounting a base station antenna. One of the most popular is the chimney mount which is simply strapped securely to your chimney with steel straps. Other methods include tripod mounting and wall mounts.



Lightning Protection. Your CB antenna will probably be the highest point on your house, and it will accumulate a static charge, particularly during thunderstorms. Chances of having your antenna struck by lightning are reduced considerably if the static charge is drained off. This may be done by grounding the antenna mast directly, and the antenna through a coax static discharge unit.



Coax static discharge unit

These devices will not withstand a direct hit from lightning. In severe storms the safest thing to do, to protect your equipment (and yourself), is to disconnect the antenna from the transceiver.

Grounding is accomplished by running a large conductor (No. 8

gauge or larger) wire from the antenna mast and from the coax discharge unit to a rod or pipe driven into the ground. An outdoor water pipe which comes up from underground may be used. The coax static discharge unit connects between your antenna cable and transceiver and helps protect your equipment from damage.

Operating Position. If your base station is going to be operated continuously for extended periods of time, as in a business where it will be used for dispatching, you will want the operating position to be comfortable enough to allow hours of operation without fatigue.

Station controls should be within easy reach and the microphone immediately at hand. You might want to replace the hand-held mike normally supplied with your transceiver with a desk-type microphone. These usually have a lock position or switch which allows you to transmit without having to hold down the mike button.

Desk-type microphone with locking push-to-talk switch

Installing Your Mobile Two-Way Radio

Installing a CB radio in any type of vehicle—car, truck, boat, recreational vehicle, or even on a motorcycle—consists of essentially the same steps as in installing a base station.

To begin with, you have to decide where and how you are going to mount your transceiver and antenna. You then have to run the cable from the antenna to the transceiver and provide a source of power (in this case, usually 12 VDC from the vehicle battery).

Actually, installing a two-way radio in your car is easier than installing a stereo tape player. You don't have the two additional speakers to mount and run wires to. Your mobile installation may be permanent or temporary. Since all the same elements are involved, let's look first at a quick and easy temporary set up.

If, for example, you do a lot of travelling and use rental cars, or have a used car lot and drive a different car every few days, or for any reason would like to have a two-way CB radio that you can quickly and easily move from one vehicle to another, you can do so very simply. All you need is a magnetic mount CB antenna (Radio Shack No. 21-940) and a cigarette lighter plug for power.

To set up your mobile radio, simply place the magnetic mount antenna in the center of the roof or trunk, run the antenna cable in through the window and connect it to the transceiver. Place the transceiver on the seat next to you, plug the power cord into the cigarette lighter socket and you are on the air!

In a permanent installation the antenna is mounted securely and the antenna cable run neatly through the car; the transceiver is fastened, usually under the dash or to the transmission hump, or in some cases inside the glove compartment, and the power leads are securely connected to a source of 12 VDC.

Another method of installation which is becoming quite popular is the use of slide-in mounting brackets. With this method one part of the mounting bracket is permanently installed in the vehicle (or vehicles). The CB transceiver is attached to the mating half. When the transceiver is to be used you simply slide it into the bracket and connect the antenna and power cables. Disconnect and slide out to remove as a deterrent to theft or to use it on more than one vehicle.

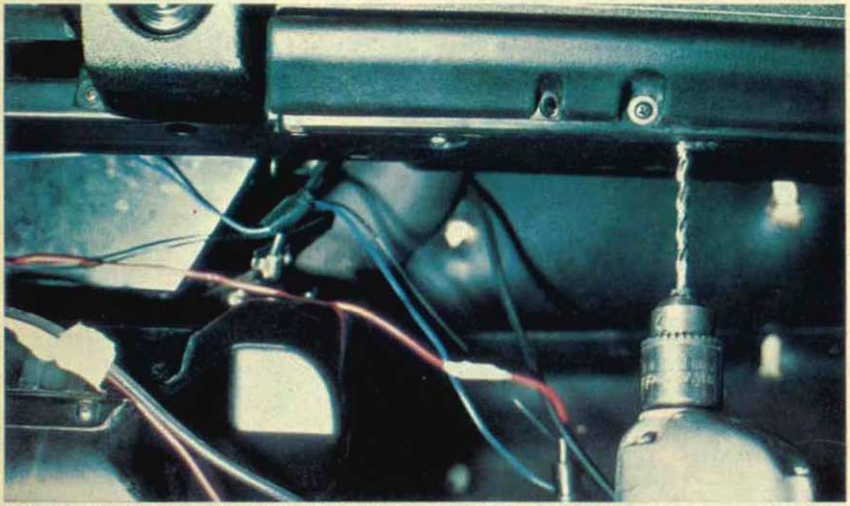
Mounting the Transceiver. Begin your mobile installation by deciding


DELTA TUNE
REALISTIC
TRC-24C
ALL CHANNEL - ALL CRYSTAL


AWB 490

where you are going to mount your CB radio. Attach the mounting bracket to the transceiver and try it in the position where you plan to mount it.

Will you be able to reach it easily? Once the mounting bracket is installed, will you have enough room to fasten the screws to the bracket? What about room for the microphone and antenna connectors?

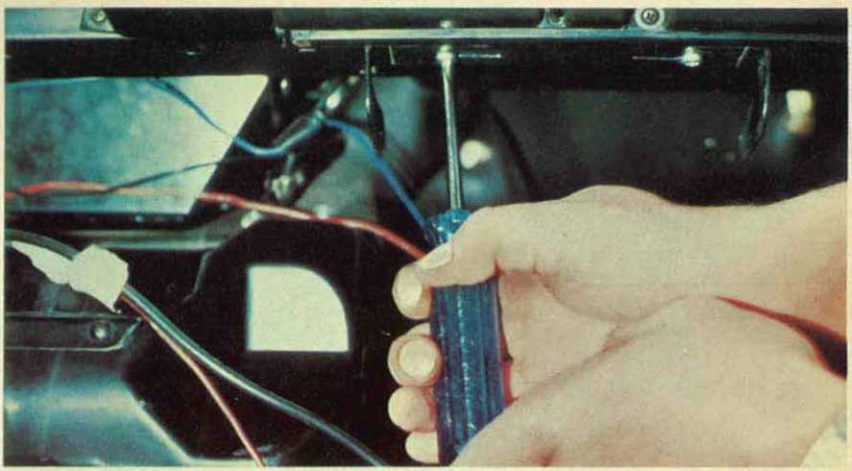


Drill holes for mounting

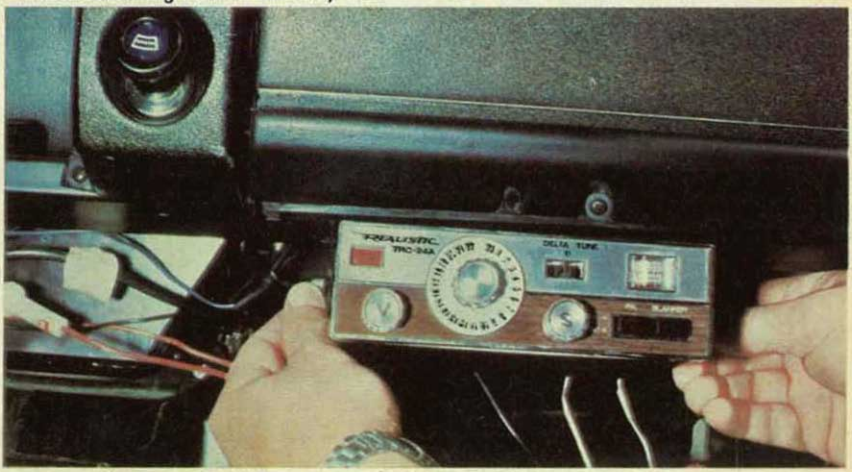
Quite often you can take advantage of one or more holes already in the underside of your dashboard for fastening the mounting bracket, or make use of an already-installed bolt which can do double duty by holding up one end of your transceiver bracket while still serving its original purpose.

Carefully position the mounting bracket where you are going to mount it and mark the spot where you will drill the mounting holes. ***Before*** you drill any holes check carefully behind the dash to be sure you will not be going into anything else, as into the bottom of your car radio, a wiring harness or a panel switch.

Use a punch to start the spot where you are going to drill. This will keep your drill bit from skidding off the spot where you want your hole. Check your positioning again before you drill your second hole to be certain the alignment is correct.



Fasten mounting bracket securely



Attach transceiver to bracket

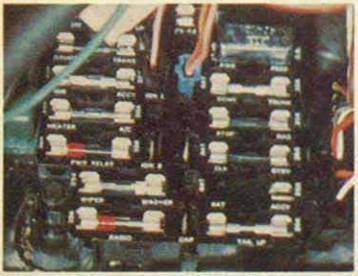
Consult the installation instructions supplied with your CB radio, and using the appropriate hardware, fasten the mounting bracket securely to the dash. You may, at this point, want to use one of the mounting screws to fasten your CB radio ground lead (usually the black, unfused lead).

On vehicles with non-metal dashboards a connection to some part

of the chassis will be needed. Look for an already installed screw to use, possibly one in a metal support structure.

Fasten the CB transceiver securely to the bracket. If you are going to install a microphone clip or hanger, select the location for it. Keep in mind the safety and convenience factors already mentioned. Mount the mike clip where you can reach it easily without leaning, and where it will not interfere with the safe operation of your vehicle.

Magnetic mike clips are available which do not require drilling additional holes. You might want to use one of these at least temporarily, until you decide exactly where and how to best mount your mike clip.



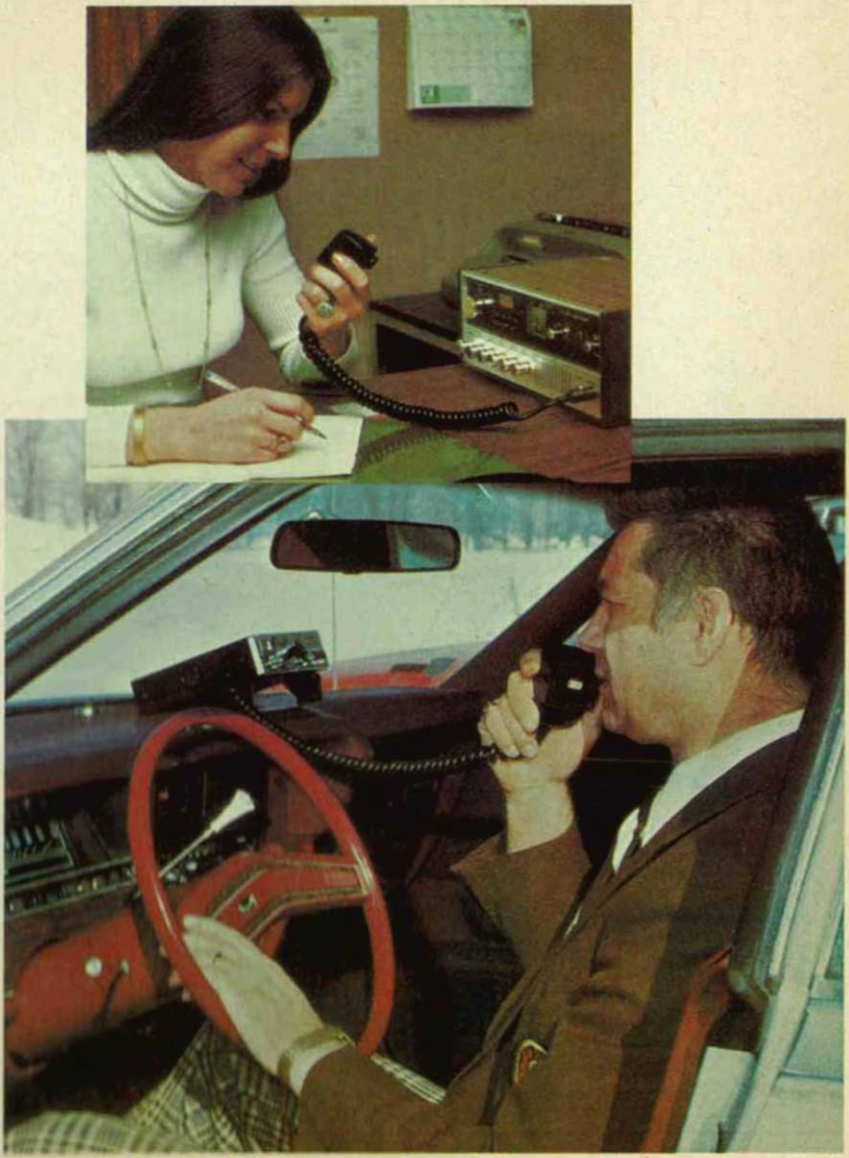
Fuse Block

Power Source. Your transceiver's ground (negative) lead should, at this point, be connected to a point which contacts the frame or chassis of the vehicle, or—in a boat—to the negative ("—") side of the battery.

The positive lead for your CB radio has to be connected to the positive terminal of the battery. This can be done by connecting it to the accessory terminal of your ignition switch, to the fuse block, or to any "hot" lead. You might want to have your auto mechanic or service station attendant help you with this step if you are not sure of exactly where to make this connection.

For positive ground vehicles the positive lead goes to the vehicle's chassis (see your owner's manual for specific instructions).

Wherever you decide to connect the power source leads for your transceiver, be sure the connections are secure, taped if necessary, and route the wires neatly behind the dash. You can fasten them to some other wiring harness already in the car to keep them from hanging down or getting in the way.



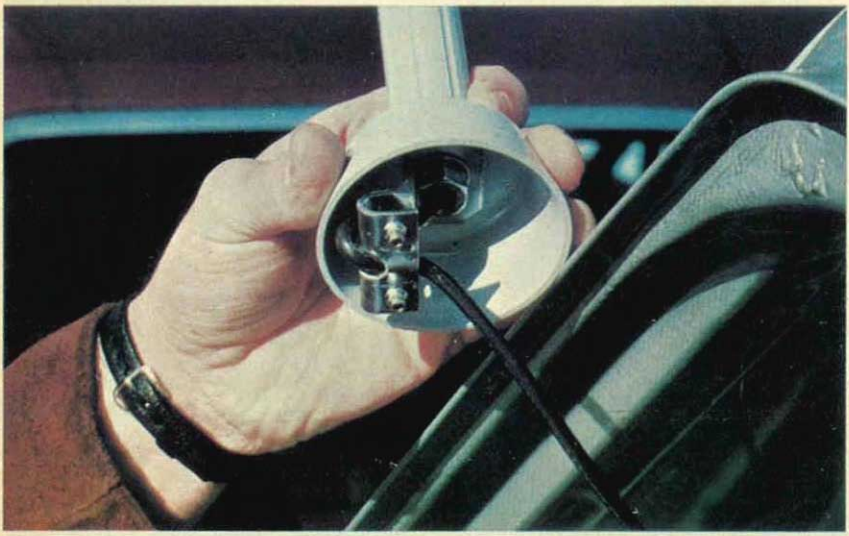
Check over your connections and mounting, then see if you have power by turning the transceiver on for a moment (it should light up and you will hear some noise from the speaker). Don't forget to turn the ignition key to the accessory position if you have the radio wired to the accessory terminal. ***Never press the microphone switch without having an antenna connected to the transceiver.***

Mobile Antenna Installation

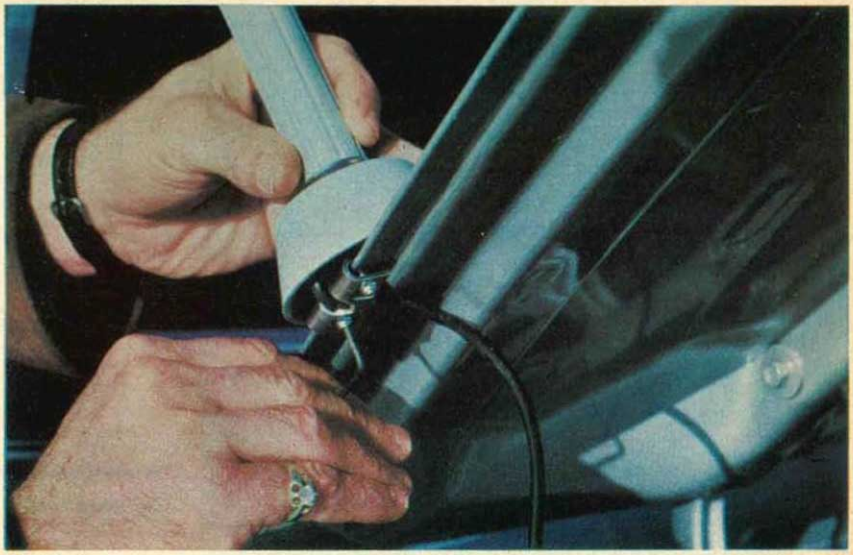
Mounting the Antenna. There are many types of mobile antennas available for CB, and just about as many ways of mounting them. Follow the instructions supplied with your particular antenna and you should have little difficulty regardless of which you use.

One of the most popular mobile CB antennas, since it does not require drilling any holes into your car body, is the trunk mount antenna. This antenna uses two set screws to fasten it to the lip of your car trunk lid.

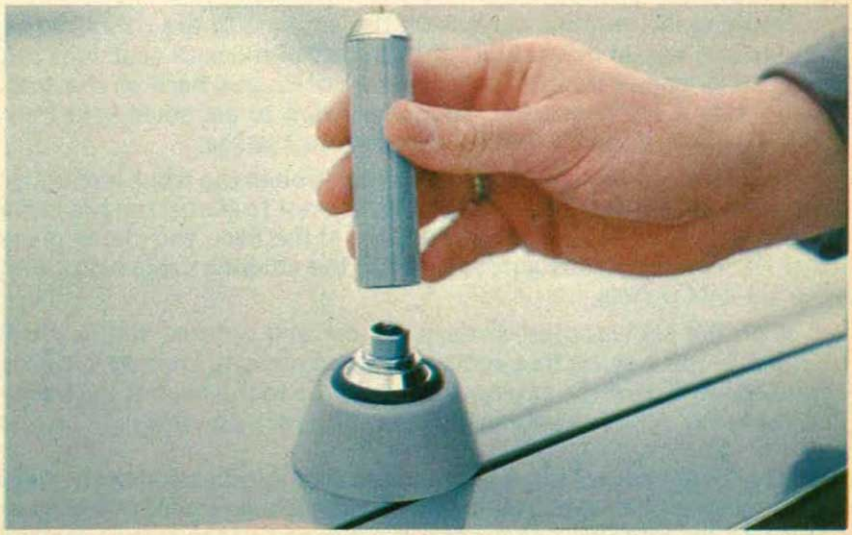
To install the trunk mount antenna, slip the mounting bracket over the edge of your trunk lid and fasten the two screws firmly. Screw the antenna on to the base.



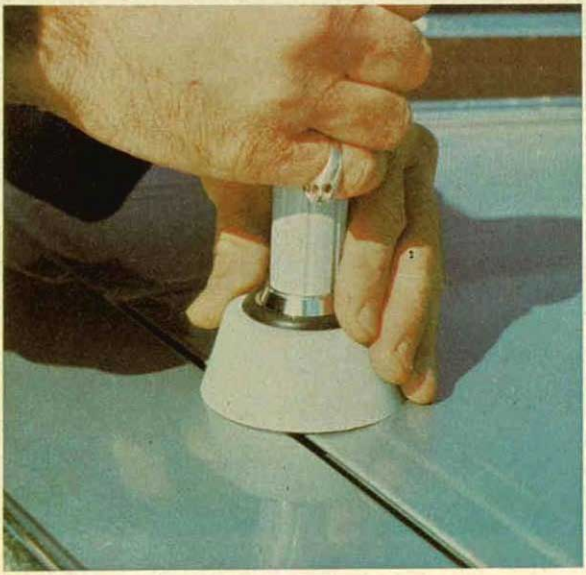
Place base over trunk lip



Tighten set screws



Position coil on base



Screw loading coil on to base

Running the antenna cable from the antenna to the CB transceiver (or vice-versa) may require the removal of the back seat. This can be done in many cars by simply pressing down and back on the seat, then lifting it off its bracket. You might want to get some help from your mechanic if you have difficulty removing the seat.

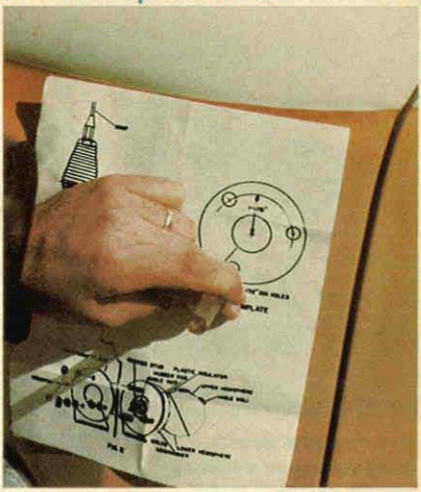
You can then route the antenna cable through the trunk and under the seats to your transceiver. If you don't want to simply run the cable under your floormats, or along the edge of the floor, you can in many cars remove the splash guards and run the antenna cable along with the tail-light wiring.

With the cable routed through the car and secured where it will not get in the way, all that remains to be done is to connect it to the transceiver. Screw the antenna connector on to the back of the transceiver firmly, re-check your installation, and you're on the air!

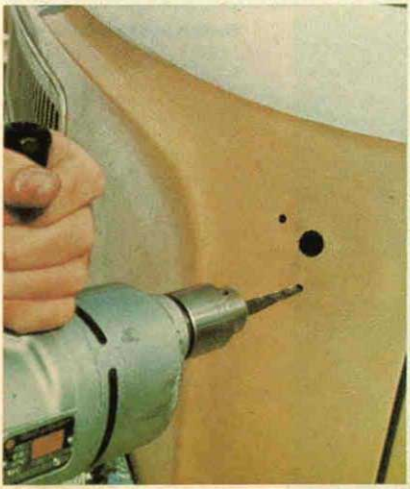
NOTE: Some vehicles have ungrounded (not in contact with the vehicle frame) or non-metallic body panels. These will require that the antenna be mounted on a grounded, metalic part of the body or on the vehicle bumper.

Installing a Body-Mount Whip Antenna

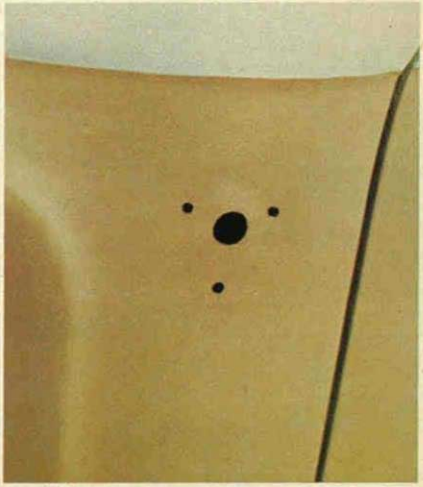
Select the location for mounting



Use the template supplied and a punch to start holes

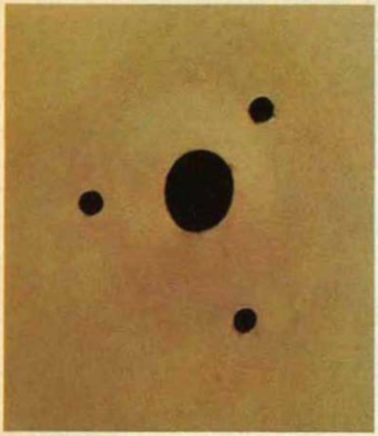


Drill mounting holes carefully

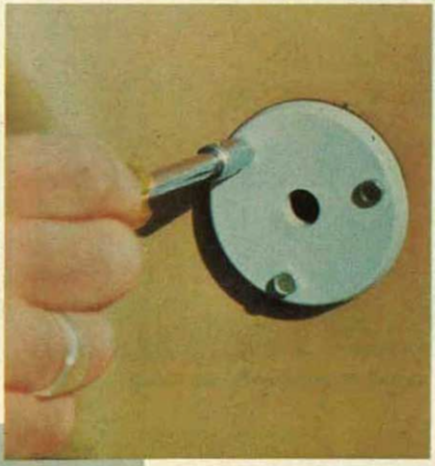


Drill centre hole or file to size

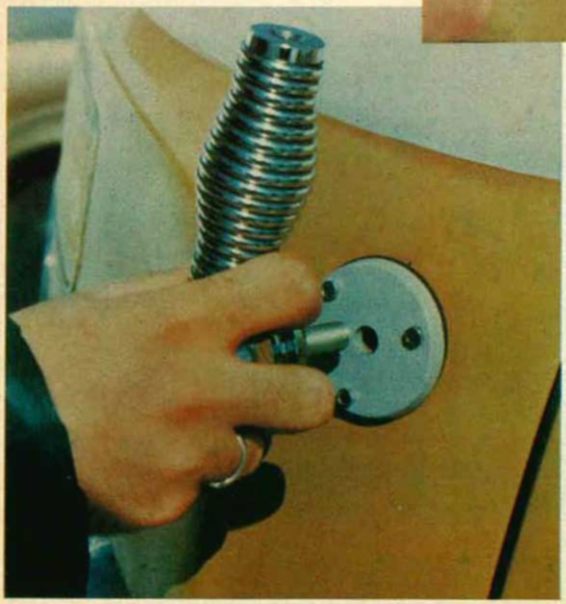
A metal punch makes this step easier, but it's not absolutely necessary



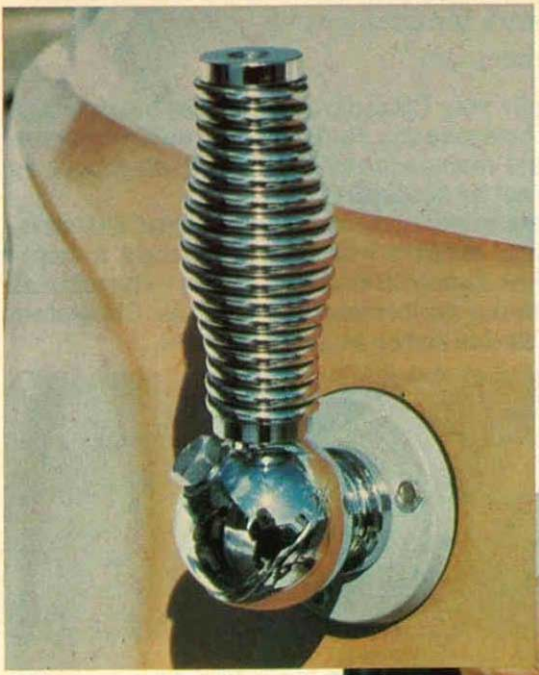
Be sure centre hole is large enough so mounting nut will not touch metal



Fasten base plate to car



Install ball-mount and spring



Adjust to upright position and tighten nut

Screw whip into spring

Final Touches: Antenna Matching and Ignition Noise Suppression

Antenna Matching. Normally, your CB radio antenna may be used with excellent results just as it comes to you. Radio Shack's own Archer antennas are engineered and manufactured to exacting standards so that additional tuning will not be necessary.

The actual improvement in performance which may be gained by "tuning" or "matching" your antenna will range from slight to negligible in most cases. However, those CB users who want to be assured of getting absolutely optimum performance out of their CB system may do so with a low-cost device known as an SWR meter.

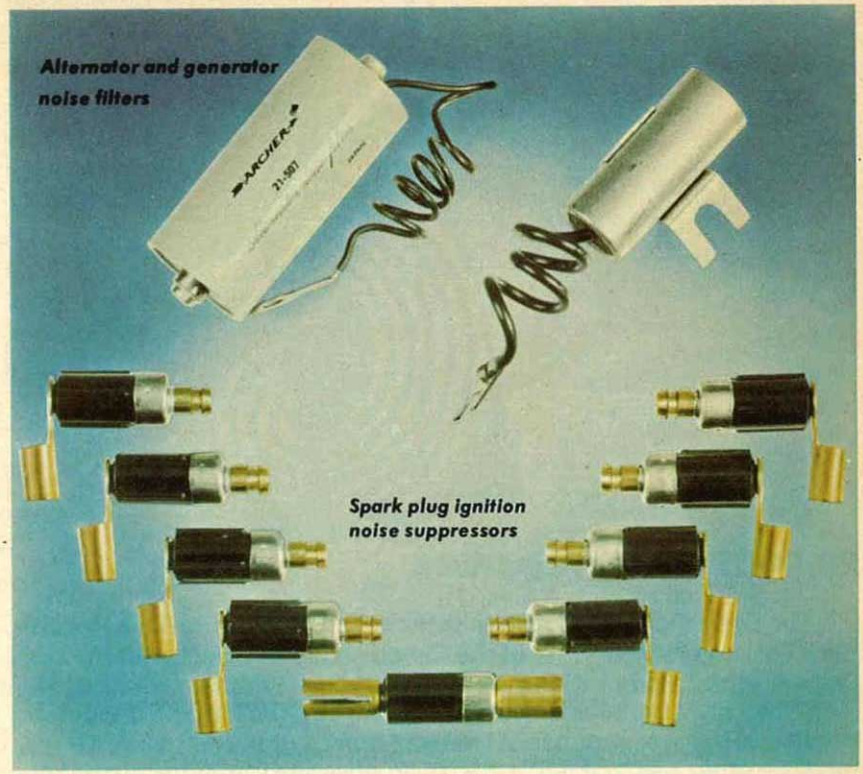
CB station tester with SWR meter

Antenna tuning requires only slight adjustments in the length of the antenna or antenna elements. With some antennas this is done by sliding one piece into another and tightening a set screw. On others it requires trimming or actually cutting the antenna.

Obviously, once you cut off a piece of your antenna you cannot replace it, so this operation must be done very carefully to avoid going too far. Specific instructions for tuning each type of antenna are supplied with the antenna.

Directions for using an SWR meter or other CB station tester are supplied with the particular units. Basically, their use consists simply of connecting the meter between the transceiver and antenna, adjusting the meter calibration, and reading the meter. A reading of 1.2 through 1.5 to 1 is average.

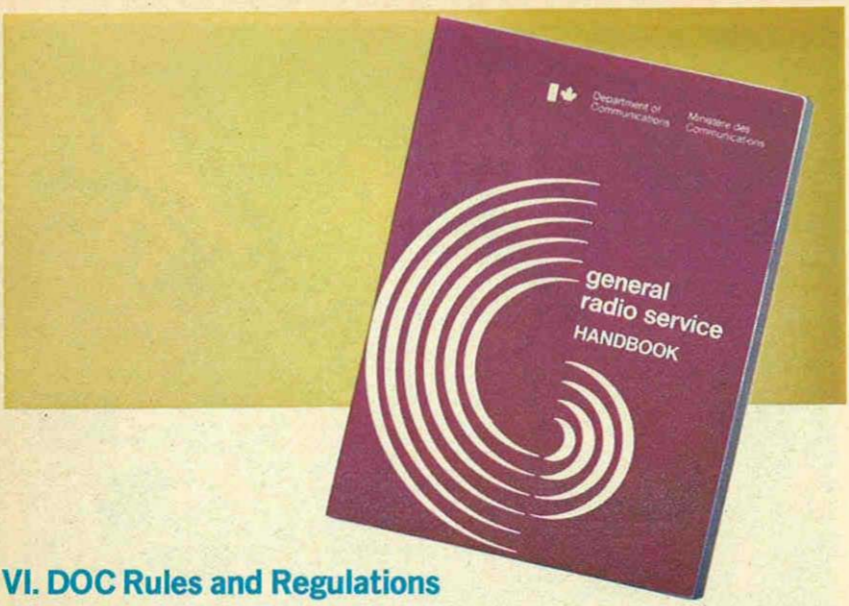
Ignition Noise Suppression. The noise you may hear on your CB radio caused by your vehicle's electrical system is referred to as ignition noise. In recent years, most cars have been engineered to eliminate this annoying problem.



With some vehicles, and particularly older models, it can still be a problem.

Primarily, the areas which may produce noise interference on your radio are the generator or alternator, and the spark plugs. The generator or alternator will produce a whining sound which will vary in pitch with the speed of the engine. A noise filter can be easily installed which will greatly reduce this type of interference.

Ignition noise may also show up as a popping sound through your radio which will also vary with engine speed. This is caused by the high voltage discharge of your spark plugs and may be eliminated through the use of special resistance wiring or resistor spark plugs, or by the addition of an ignition noise suppression kit to your existing electrical system. These kits are available from Radio Shack.



VI. DOC Rules and Regulations

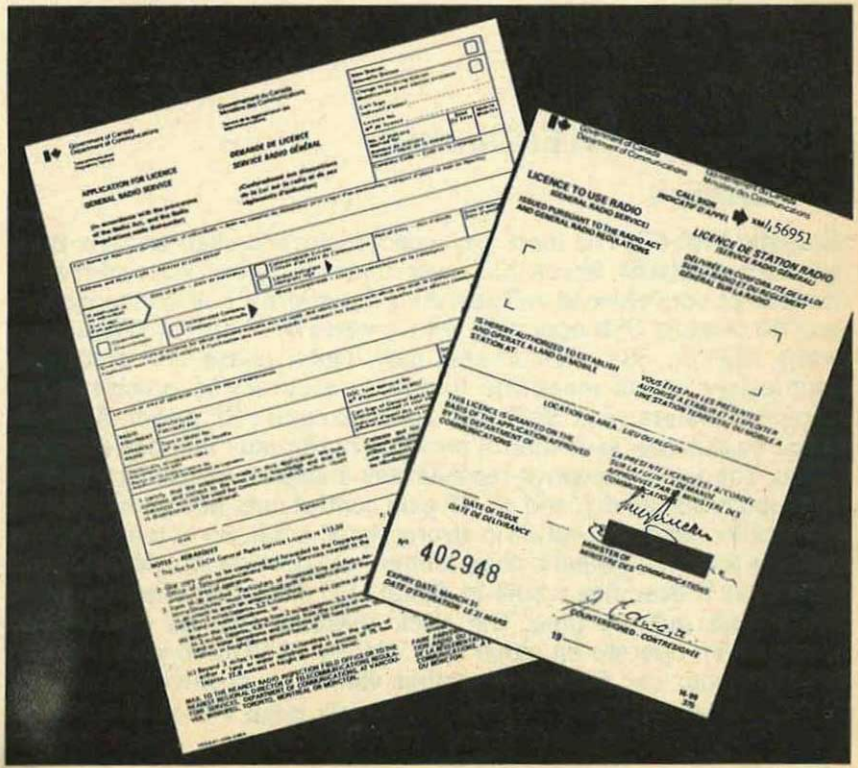
The Department of Communications, Telecommunications Regulatory Services is the agency of the Canadian Government with the responsibility for licensing and regulation of the General Radio Service. The rules and regulations, established for the DOC for GRS are not intended to hamper your use of two-way radio, but rather to assure you, and the other users of GRS radio, of an effective communications service, with the greatest benefits for everyone.

The DOC regulations for the use of GRS, are much like a traffic light at a busy intersection – each keeps the flow of traffic orderly and gives everyone a chance to get through. If, for example, there were no restrictions on distance, power and antenna height, a high-powered station with a giant antenna, 200 miles away from you, talking to his neighbour, might interfere with your communications, locally. Without the time limitation on communications, an inconsiderate 'rachet jaw' might hog a channel for hours. If the equipment you use did not meet the standards set by the DOC, it might be poor in quality and possibly interfere with communications on other channels, or it might be off frequency so that others would be unable to hear you.

Getting your Licence

Getting your GRS license is easy. There is no test to take and no special knowledge is required. All you need do is: 1) meet the eligibility requirements, 2) obtain a copy of Radiotelephone Handbook, containing DOC regulations for GRS operation, 3) fill out an application form and send it with a cheque or money order for 13.50 to DIRECTOR OF TELECOMMUNICATIONS REGULATORY SERVICES, DEPARTMENT OF COMMUNICATIONS in your vicinity.

When you purchase a Radio Shack Realistic CB radio, you are provided with a GRS license application. Your store manager will be happy to assist you in filling it out.



VII. Realistic CB Equipment

Transceivers

Realistic TRC-57. The most advanced, feature-packed citizens band transceiver Radio Shack has ever offered! Every state-of-the-art feature for convenience and operating superiority. Full 23 channel AM and 46 channel SSB operation with 4 watts MAX output AM, and 12 watts PEP on SSB. Remarkable new digital phase lock frequency synthesizer circuit maintains frequency accuracy to precise limits. Separate meters read SWR and signal strength/RF power. An automatic modulation gain control provides maximum "talk power" at all times. The super-sensitive receiver has a special crystal lattice filter for superb selectivity, and an RF gain control cuts background interference for easier reception in strong signal areas. An automatic noise blanker and an automatic noise limiter help provide interference-free reception. It even has a built-in digital LED clock that shows 12-hour or 24-hour military time. The clock operates only on AC, but the TRC-57 can operate on either 120 VAC or 12 VDC so you can even use it in your car, boat, RV or other vehicle — positive or negative ground. Comes complete with push-to-talk mike, AC and DC power cords and mobile mounting brackets.


USB
LSB
REALISTIC SSB+AM TRC-57
PA
NB
ANL
CAL
SWR CAL
RF GAIN

TRC-48 21-150

Realistic TRC-48. Packed with value and features, this base/mobile AM/SSB transceiver features a Radio Shack first — a remote volume control built into the mike for really convenient mobile operation. Frequency synthesized for full 23-channel AM and 46-channel SSB use with 4 watts MAX on AM and 12 watts PEP on SSB. A built-in Range Boost circuit provides top talk-power. The S/RF meter turns red while transmitting. There's an ANL to reduce impulse noise on AM and an integrated circuit noise silencer on SSB. Glide-Path controls for RF gain and squelch. A special PA switch lets you use the TRC-48 as a public address amplifier and still receive CB calls. Complete with push-to-talk mike, 120 VAC and 12 VDC power cables and mobile mounting bracket.

Realistic TRC-55. The perfect transceiver for serious CB users — ideal for businesses. Ready for full 23-channel operation with 4 watts MAX of power output. An automatic modulation gain circuit punches through without a pre-amplified mike. Sensitive dual conversion ANL and noise blanker to eliminate interference. Delta fine tuning helps get off-frequency stations. Can be used as a PA system while still monitoring CB calls. Dual SWR and S/RF meters; ON-THE-AIR and MODULATION lights; lighted channel indicator. A built-in digital clock and timer with alarm turns on the TRC-55 at any time you preset, with or without a power-on buzzer alarm. (Clock operates on AC only). Complete with push-to-talk mike, 120 VAC and 12 VDC power cables, mobile mounting bracket.

Realistic TRC-30A. The number one choice of those who want the most important base/mobile features at a budget-pleasing price. Full 23-channel frequency synthesized operation with 4 watts MAX output plus Range-Boost for maximum signal reach. The sensitive dual-conversion receiver, with IF filtering and Delta fine tuning pulls in even the weak and off-frequency stations, while a built-in ANL reduces interference. Lighted S/RF meter, channel indicator and ON-THE-AIR and MODULATION lights. With push-to-talk mike, 120 VAC and 12 VDC power cords and mobile mounting bracket.

Mobile Transceivers

TRC-47 21-147

Realistic TRC-47. The mobile CB radio to really "get through"! Ready to go with 23 AM channels and 46 SSB channels; 4 watts MAX AM, 12 watts PEP SSB. Dual conversion receiver and R/F circuit with crystal lattice filter for top sensitivity and selectivity. Built-in ANL. Dual concentric volume and RF gain controls. Modulation indicator lamp, illuminated channel selector. With push-to-talk mike, power cable and mobile mounting bracket.

TRC-56
21-153

Realistic TRC-56. Radio Shack's new look in CB. Not just a frill — the telephone-type mike and speaker handset considerably reduces background noise as you talk. You can receive messages clearly and privately, even in high noise locations. Push-to-talk switch is built into the handset. A speaker/handset switch lets you listen with the handset, built-in speaker or both. 23 channels, 4 watts MAX output. An automatic modulation gain circuit provides constant "talk power". The S/RF meter has a built-in modulation indicator light. Receiver is dual conversion with ceramic filters for superb selectivity, and a noise blanker and ANL provide superior noise suppression. Delta fine-tuning helps bring in off-frequency stations. You can even add an external speaker and use the TRC-56 as a mobile public address system. Operates on 12 VDC, positive or negative ground. Includes power cable and mobile mounting bracket.

Realistic TRC-24C. Radio Shack's most popular deluxe mobile two-way CB radio. Full 23 channel operation, 4-watt MAX output. It has an ANL and noise blanker, dual conversion receiver, modulation indicator light built into the S/RF meter. Delta tune. Mobile PA provision. Everything needed for optimum mobile performance on 12 VDC, positive or negative ground. Comes with push-to-talk mike, power cable and mobile mounting bracket.

TRC-24C 21-145

Realistic TRC-52. Great appearance plus great performance. Full frequency synthesized 23 channel operation with 4 watts MAX output. The dual conversion receiver has an RF gain control to help separate strong and weak signals — reduces background clutter. A switchable ANL eliminates low-level impulse noise. Other features include an illuminated S/RF meter and channel selector, LED modulation indicator and public address capability. Operates on 12 VDC, positive or negative ground. With push-to-talk mike, power cable and mobile mounting bracket.

Realistic Mini-23 TRC-68. The no-nonsense transceiver — gets right down to basics. Provides the power and performance of radios twice its size, yet is only 1½ x 5¼ x 7-7/8". Full 23-channel frequency synthesized operation with 4 watts MAX output. Illuminated rotary channel selector, transmission/modulation indicator, volume and squelch controls. Built-in automatic noise limiter. Dual conversion receiver. For 12 VDC, positive or negative ground. Complete with push-to-talk mike, power cable and mobile mounting bracket.

Realistic TRC-11. An excellent choice for most local business purposes or for any use where all 23 channels are not needed. Six channel capability — comes equipped with crystals for channel 11 — install additional crystals for up to five more channels. Has lighted channel selector, modulation indicator lamp, volume and squelch controls, and switchable ANL. Only 1½ x 4¼ x 6½". Operates on 12 VDC, negative ground. With push-to-talk mike, power cable and mounting bracket.

Realistic TRC-9A. Compact, convenient and easy to use, this is the transceiver no vehicle should be without. It's ideal for emergency use — fits under dash, seat, even in many gloveboxes. Only 1½ x 4¼ x 6½". Equipped with crystals for channel 9, the nationwide Highway Emergency Locating Plan (HELP) frequency. You can add two more sets of crystals for three channel operation. Full RF output, AGC, Noise Limiter, volume and squelch controls. Pilot lamp doubles as a transmit/modulation indicator. For 12 VDC, negative ground. Complete with push-to-talk mike, power cable and mobile mounting bracket.

Walkie-Talkies

Realistic TRC-101B. Actually a complete, full-feature CB two-way radio in a hand-sized package! All crystals included for full 23-channel operation. 5 watts input. Built-in telescoping antenna and self-contained battery power supply. Sensitive built-in mike and speaker. Fine tuning switch, dual conversion receiver circuitry, ANL, RF/battery condition meter, hi-lo power switch. With 10 "AA" cells (or use optional rechargeable nickel cadmium cells) and can be powered by optional AC adapters. With carry case.

Realistic TRC-100B. Powerful hand-held transceiver has 5 watts input, provision for up to 6 channels — comes with crystals for channel 11. Built-in mike and speaker, telescoping antenna, RF/Battery meter. Uses 10 "AA" cells (included) or rechargeable cells and can be powered by optional AC adapters. With carry case.

TRC-100B 21-134

TRC-101B 21-129

Realistic TRC-99C. Ruggedly constructed and ready to go — great instant communication system. 3-channel operation and 3 watts input. Includes crystals for channel 11. RF/battery meter. Telescoping antenna. Built-in mike and speaker. Automatic gain control keeps volume steady when receiving fluctuating signals. Uses 10 "AA" cells (included) or optional rechargeable cells. With carry case.

Realistic TRC-35C. The "Rover 1500" is Radio Shack's lowest-priced "professional" walkie-talkie. 1½ watts input, 3-channel capability. Includes crystals for channel 11. Battery meter. Telescoping antenna, built-in mike and speaker. Uses 8 "AA" cells (included) or optional rechargeable cells. With carry strap.


TRC-35C 21-117
REALISTIC
REALISTIC
A B C
THC-99C
3
WATTS
RS
TRC-99C 21-133

100 mW Walkie-Talkies

Realistic TRC-27. Radio Shack's finest-ever "no licence" set. All the features of a full-power walkie-talkie — volume and squelch controls, battery condition indicator, telescoping antenna, automatic gain control and "beeper" to alert other stations. Comes with crystals for channel 11, add two more sets for three channel capability. Ruggedly designed, military styling. The perfect walkie-talkie for short range outdoor use — camping, hiking, fishing, sports activities. Uses 8 "AA" cells (included) or optional rechargeables. With adjustable wrist strap.

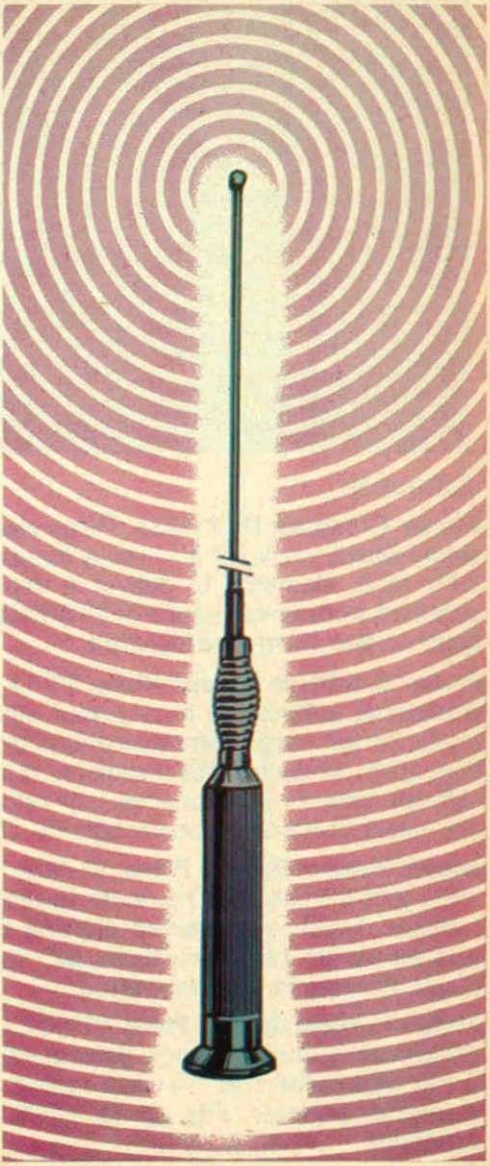
Realistic TRC-25A. Convenient two-way communications instantly anywhere — like having a portable wireless intercom. 2-channel capability, with crystals for channel 11. Separate speaker and mike, battery condition meter, "beeper" to signal other stations, telescoping antenna. With 9-volt battery, wrist strap.

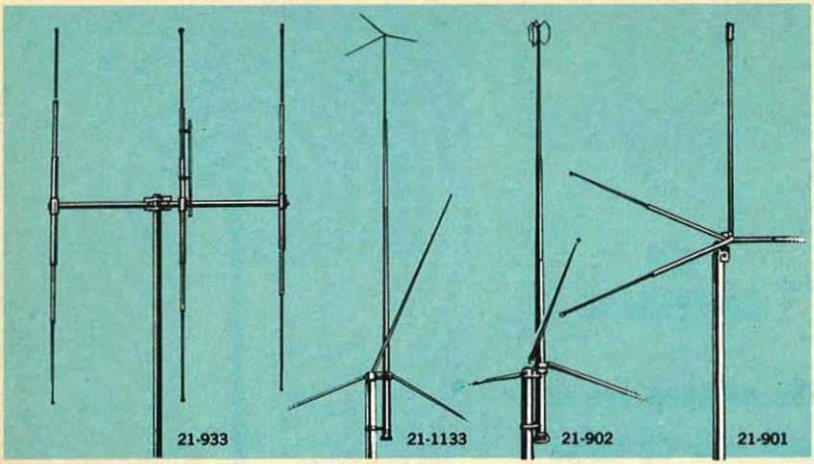
Realistic TRC-4. A lot of features at a little price. The TRC-4 has 2-channel capability, comes with crystals for channel 11, "beeper" to alert other stations, telescoping antenna, up-front speaker/mike. Comes with 9-volt battery, wrist strap.

Realistic TRC-3. Single channel walkie-talkie is handy to have and fun to use on family outings, picnics, hikes. Great for youngsters. Has a combination speaker/mike, telescoping antenna, tough hi-impact case. Crystals for channel 11. With 9-volt battery, wrist strap.

CB ANTENNAS

The antenna you use with your CB Radio is just as important as the radio itself. No matter how good your transceiver is, it will be of little value without an antenna ... the right type for your particular needs. Refer to chapter II for more information on antenna performance.





Antennas

Archer Crossbow III. 21-933. Three element beam lets you aim your signal where you want it — really increases range! Has a 12-ft. boom with 18-ft. elements to deliver a minimum gain of 9 dB with an excellent front-to-back ratio of 25 dB. Gamma matching. All aluminum construction. Hardware included.

Archer 5/8-Wave Ground Plane. 21-1133. Radio Shack's best omnidirectional antenna. It boosts your signal 4 dB in all directions — made for full range communications and virtually static-free reception. 19-ft., 10-inch vertical radiator is a full 5/8 wave-length electrically for superior performance. Low radiation angle. Fits up to 1-5/8" dia. masts. Static arrestor. Accepts PL-259 connector.

Archer ½-wave Ground Plane. 21-902. Omnidirectional antenna provides 3.75 dB gain. Has hex loops to dissipate static, end-fed ½-wave radiator, moisture-protected phasing transformer, 5-section seamless aluminum radiators, three 52" radials. Fits up to 1-5/8" dia. masts. Accepts PL-259 connector.

Archer ¼-Wave Ground Plane. 21-901. Low in cost, yet high in quality, performance and efficiency. Beta-matched for low SWR. Omnidirectional with three 108" ¼-wave radials, plus ¼-wave radiator. Static discharge arrestor. Fits up to 1-5/8" dia. masts. Accepts PL-259 connector.

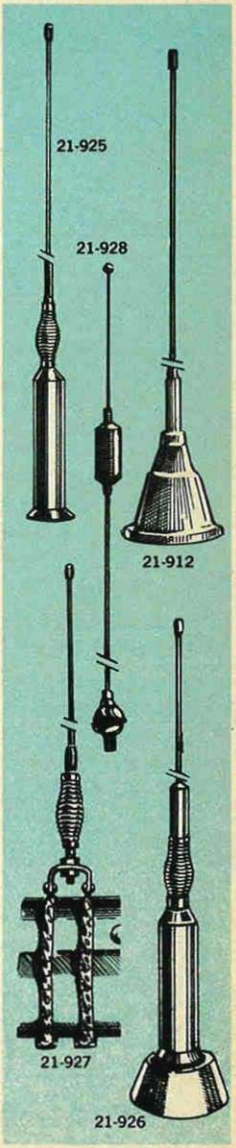
Archer 102" Bumper Mount Fiberglass Whip. 21-927. Built for top performance. Adjustable dual chains and bracket make this package mountable on most bumpers. Chrome-plated shock spring protects whip. Includes instructions, mounting hardware, vinyl chain cover, gutter clip. Less cable.

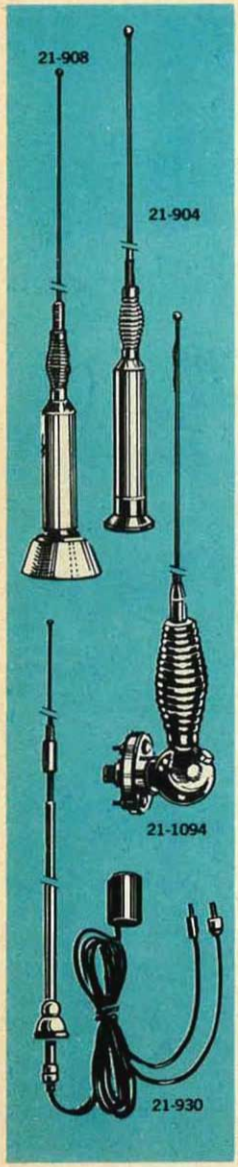
Archer 40" Fiberglass Roof Mount. 21-925. Gives the best omnidirectional signal pattern. Can also be used on trunk deck. Rugged weatherproof base-loaded coil for excellent impedance match and maximum radiation with minimum height. With stainless steel shock spring, easy 3/8" — 24 snap-in mounting, solderless connections. Includes 16-ft. coax cable and connectors.

Archer 42" Fiberglass No-Hole Trunk-Grip Mount. 21-926. One of the most popular CB antennas. Includes stainless steel shock spring and whip. Easy 2-screw installation without drilling. Simple cable entry. Can be attached to front or sides of trunk lid. Less cable.

Archer 102" Fiberglass Marine/Camper/Apartment Whip. 21-912. Quarter-wave antenna especially designed for mounting on non-metallic surfaces like fiberglass or wood. No ground plane needed. Exclusive Radio Shack patented mount provides "lay-down" feature from both vertical and horizontal mounting surfaces. All stainless steel mounting hardware and leveling washer. With 21-ft cable, PL-259 connector.

Archer 37" Cowl-Mount. 21-928. Mounts just like an ordinary car radio antenna. Has sealed coil and stainless steel whip. Offers good coverage anywhere. Ball mount assembly allows





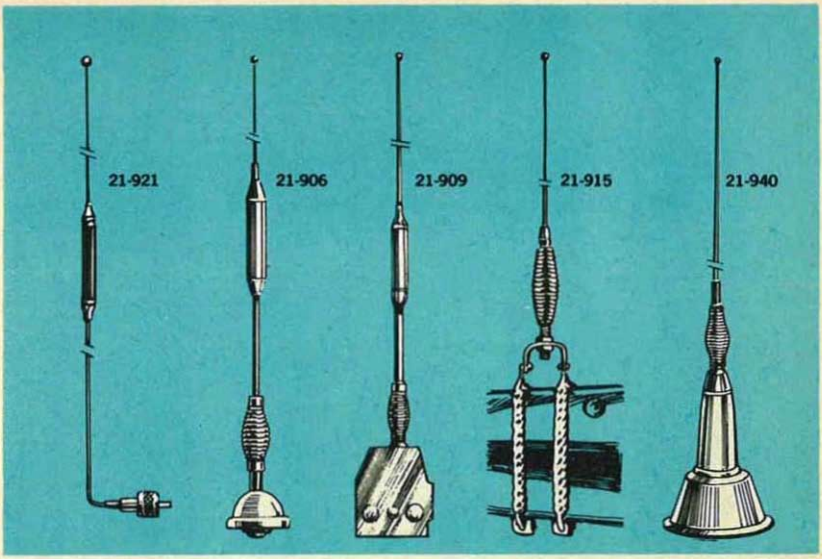
mounting on surface with maximum slant of 35° from horizontal. Solderless connections. With 5' cable, connectors.

Archer 44" No-Hole Trunk Mount. 21-908. Mounts easily with two set screws on either centre or side of trunk lid without marring car's finish. Comes equipped with stainless steel whip and spring. Base loaded coil provides the same superb performance as roof mount antennas. Solderless connections. Less cable.

Archer Cowl/Side Mount CB/FM/AM. 21-930. A "disguised" CB antenna that's also a replacement for an ordinary auto radio antenna. Telescoping 50" whip and tunable loading coil plus matching network make a complete antenna system for good CB. FM and AM performance. Stainless steel and chrome-plated sections, chrome mount. For standard front fender or body installation. 68" cable has auto radio and PL-259 connectors.

Archer 102" Body Mount. 21-1094. The standard in CB mobile antennas. Stainless steel whip for long lasting efficiency and strength. Mounts on any flat area or vehicle body. Has swivel ball mount, insulator and heavy back-up plate to provide easy universal mounting. No special tools needed. With chrome-plated steel spring for flexibility and lug terminal connections. Less cable.

Archer 42" Roof Mount. 21-904. Base loaded for optimum efficiency. Heavy-duty stainless steel spring and whip. Built to fight rust and provide rugged service. 3/8"-24 snap-in mount for simple installation, solderless connections. With 16' cable.



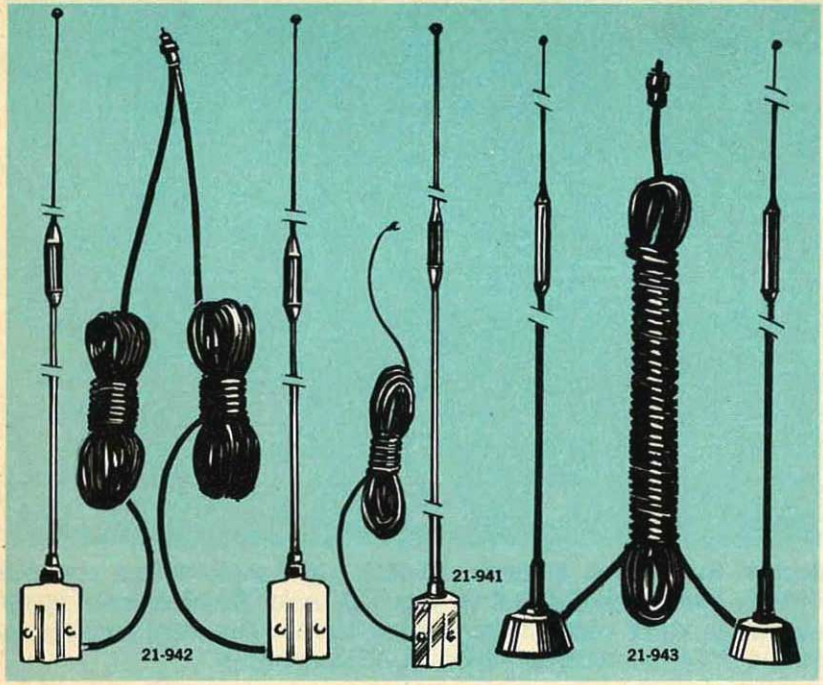
Archer Back-of-Set Antenna. 21-921. Right-angle design connects directly into coaxial socket on your CB radio. Stainless steel upper, aluminum lower construction, centre-loaded. The ideal antenna for temporary or portable operation. PL-259 connector.

Archer "Shorty" Roof Mount. 21-906. Center-loaded coil, stainless steel whip and spring, chrome-plated support tube. Easy snap-in mount. With 16' cable, PL-259 connector.

Archer 18" Gutter Clamp Antenna. 21-909. Clamps to the rain gutter around your vehicle roof. Centre-loaded stainless-steel whip and spring, chrome-plated support tube. With 10' coax cable. PL-259 connector.

Archer 102" Bumper Mount Antenna. 21-915. Stainless steel whip, dual chain and bracket for mounting on most bumpers. Chrome-plated spring. With all mounting hardware, vinyl chain cover, gutter clip. Less cable.

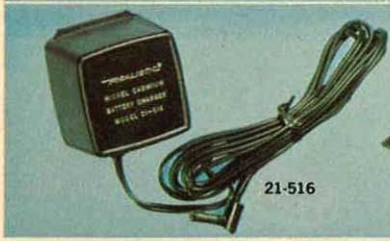
Archer Base Loaded Magnetic Mount Antenna. 21-940. An "instant" antenna for any vehicle. No holes to drill, no tools needed. Simply place on any metallic surface, — roof, trunk lid, fender. With 10' cable and PL-259 connector.

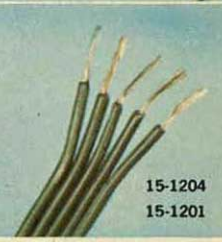


Archer "Twin Truckers II". 21-942. This is the antenna system you see on highways across the nation. For trucks and recreational vehicles with mirrors 100" or more apart. Twin antenna system provides superior coverage, reinforced signal pattern. Stainless steel upper and lower rods. Antenna mounts attach easily to side mirror brackets. 17' dual phasing harness with PL-259 connectors.

Archer "Single Truckers II". 21-941. Like "Twin Truckers" but for RV's and vehicles with single "West Coast" style mirror. Includes heavy-duty mirror mount. With 10' coax cable and PL-259 connectors.

Archer "Twin Truckers". 21-943. Dual, no-holes trunk mount antennas system provides outstanding performance. Ruggedly built using stainless steel upper and lower rods. Mounts on sides of trunk lids 20' — 6" co-phasing harness, PL-259 connector.





CB Station Accessories

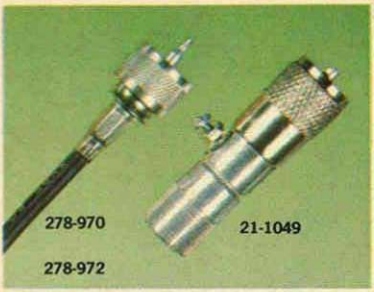
Micronta Regulated 12-Volt Power Supply/Charger. 22-8224. Powers your mobile CB transceiver from 120 VAC so you can use it at home as a base station. Converts 120 VAC, 50-60 Hz house current to 12 VDC. Regulated output is 12 VDC at 2.5 amps continuous, circuit protected.

Nickel Cadmium Battery Charger. 21-516. Charges 12 to 15 volt nickel cadmium battery packs, as used in Realistic walkie-talkies. With A.C. power cord.

12 VDC Power Cord. 270-1533. Lets you power your walkie-talkie from your car battery. Connects to external power jack on walkie-talkie — plugs into car cigarette lighter. For 12 VDC negative ground use. 8 ft. cord. Fused.

Heavy duty rotor cable. 5 conductor 50 ft. 15-1204 — 5 conductor 100 ft. 15-1201

Archer Servo-Rotor Antenna Rotator. 15-1220. Whisper-quiet rotor turns your beam antenna 360° in less than a minute. Control unit has indicator lights to show direction of rotation. Just dial any direction and the high-torque servo-motor with dynamic clutching points your antenna within 2%. Weather-resistant die-cast motor housing, life-time lubricated bearings. For 120 VAC.



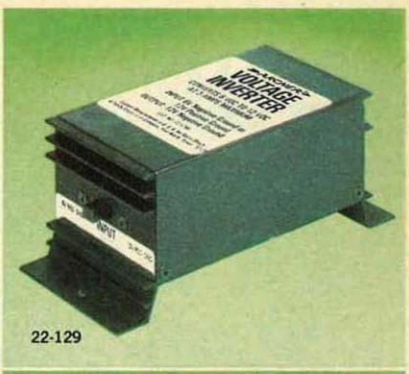
Base Station Co-axial Cable Assemblies. Co-axial cable with PL-259 connectors on each end. 50' RG-58/U 278-971 50' RG8/U 278-970 100' RG8/U 278-972

Coax Static Discharge Unit. 21-1049. Eliminates static build-up on base station antennas to protect you and your equipment.

3-Range SWR/Power Meter. 21-520. Connects between CB transceiver and antenna — needs no external power. Separate SWR and power meters.

3-Way CB Station Tester. 21-526. Features jack for antenna or dummy load, transceiver output jack. Meter reads output power, SWR, % modulation.

Field Strength/SWR Meter. 21-525. Measures SWR and checks RF field strengths. Lets you check your signal to be sure equipment is operating well.

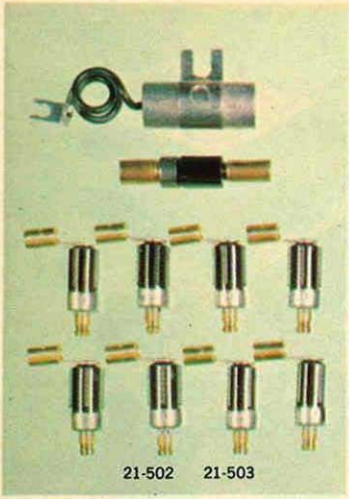


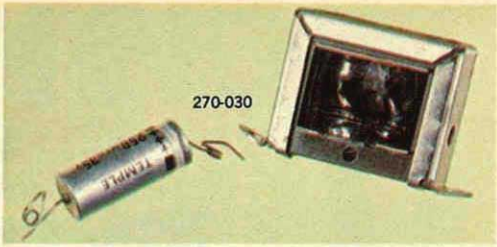
Base Station Pre-Amp Mike. 21-1170. Self-contained transistor amplifier for up to 50 times more output. Touch bar/lock switch. 3-conductor shielded cable. Requires 9-volt battery.

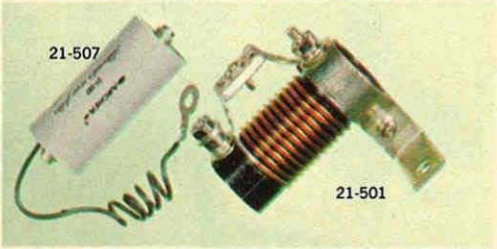
Mobile Pre-amp Mike. 21-1171. Helps maintain full modulation and power. Transistorized, adjustable output level, push-to-talk switch, coiled cord and high-impact case. Requires 7-volt battery.

DC Voltage Inverter. 22-129. Lets you use 12 VDC negative ground CB equipment in 12 volt positive ground, or 6 volt negative ground vehicles. Inputs: 6 volt negative ground and 12 volt positive ground. Output: 12 volts negative at up to 3 amps. Fuse protected.

4" Powerhorn. 40-1244. Use it as an external speaker for your CB receiver, or as a PA speaker. Ideal for CB equipment in high noise areas such as trucks, emergency vehicles, boats, etc. Mounting bracket installs at any angle. Waterproof.







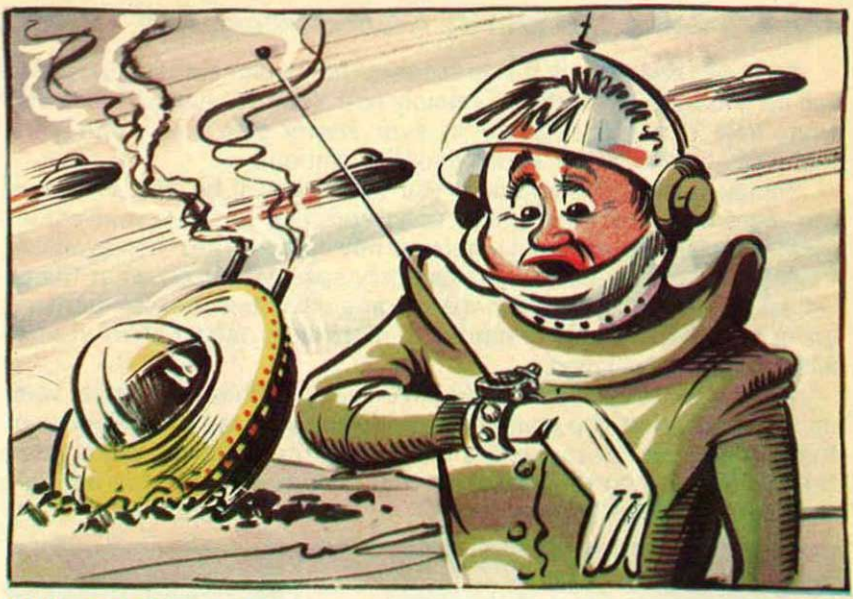
Mobile Noise Eliminator Kit. 270-030. Heavy-duty design eliminates radio impulse noise caused by ignition systems or alternators used in many cars and trucks. Simple to install. Complete instructions supplied.

Ignition Noise Suppressor Kit. Includes spark plug and distributor suppressors, bypass capacitor. With installation instructions.
21-502 6-cylinder kit & 21-503 8-cylinder kit.

Alternator Noise Filter. 21-507. Reduces receiver noise caused by alternator.

Generator Noise Filter. 21-501. Helps eliminate whine and grinding noise. Installs easily on 6, 12 and 24 volt generator.

For prices, see your current Radio Shack Electronics Catalogue.



VIII. CB Tomorrow

Every few years something comes along which catches the imagination of the public. Some enjoy a meteoric rise in popularity, then fade into obscurity. Others become such an important part of our lives that it is hard to imagine a time when they didn't exist.

Is CB radio here to stay? Or, is it just a passing fad that will be remembered nostalgically as something that was big in the seventies: a hula hoop — or one of those other "newfangled" ideas that will never catch on, like the horseless carriage, talking pictures, telephones and television?

The answer seems obvious. CB two-way radio is here to stay! More than that, CB radio will ultimately be an integral part of our daily lives – as common as wristwatches and as indispensable as ball point pens.

In the next decade and beyond, as CB continues to grow and expand in versatility, convenience and design, what can you look forward to? The area for speculation is wide open.

Today's Radio Will Still Be A Good Investment

As things change will this mean that the equipment you buy today will be unusable tomorrow? Certainly not! Your 10 year old black and white VHF TV set is as useful as ever. Newer sets simply add more features — colour TV reception and UHF stations.

Similarly, the CB equipment you buy now will be just as usable ten years from now — you need only replace or upgrade your equipment if you decide you want whatever new features are then available

At this point, or course, we can only speculate upon what things will be like tomorrow. We can make some educated guesses, perhaps going off into the wild blue yonder, or more likely, fall far short of what will actually be achieved.

Twenty years ago who would have imagined that men would walk on the moon, that you could buy an inexpensive radio, small enough to fit in your pocket (actually smaller than the batteries you needed then to power a portble radio), or that everyone could have and use their own personal two-way radio!

So what lies in store for Citizens Band radio? What seems likely to happen in terms of growth in both usefulness and technology?

More Channels. As the number of people using CB continues to grow and as the channels become more crowded in many areas of the country the need for more space will become more pressing.

SSB. Single sideband, already in use today, may well be the dominant mode in the future. Because of its advantages (outlined earlier in this book) it will certainly grow in use and, as new developments and breakthroughs are made in electronics, decrease in price.

Standard Equipment. Today, most people consider a car radio to be a basic and essential accessory. In a few years it seems likely that people will think of a CB radio in much the same way. There are already a number of progressive car and truck dealers who will custom install your Realistic CB radios on your new vehicle.

Marine Use. CB is already growing in use, especially on inland waterways, as a means of ship-to-shore and ship-to-ship communications. Although it is not presently monitored by the Coast Guard they may do so in the future. It is also possible that one or more channels may eventually be set aside strictly for marine use.

Special Services. Another possibility for the future may be the establishment of specific channels for certain services. For example, today channel 9 is used for emergencies and motorist assistance.

With more channels available it might be possible someday to set aside a channel for making motel reservations as you travel, restaurant reservations on another channel, and camping arrangements on still another. Some areas may eventually establish tourist information services, again on a specific channel all across the nation.

Priority Channels. In line with the idea of channels set aside for special services, transceivers may be designed with one or more "priority" channel features. A priority feature would either automatically switch your radio to a special channel or alert you to tune to that channel (perhaps with a lighted indicator) for special bulletins or information.

This priority feature would be invaluable to travelers if it were used on a nationwide basis to broadcast road conditions, weather or traffic information.

Equipment Design. Electronics technology has experienced tremendous advances over the past decade, particularly in the area of microminiaturization. The development of solid-state circuitry made it possible to greatly reduce the size of two-way radio equipment. Now integrated circuits are making possible even greater reductions in size.

Pocket size CB with all the power and features of today's deluxe sets is certainly conceivable, and the Dick Tracy wrist radio is no longer a far-fetched idea. Imagine a full-feature CB transceiver the size of your watch with a built in digital clock!

Repeaters. Again borrowing an idea from Ham operators, CB may someday be used with a system of local repeaters. Repeaters are automatic transmitter and receiver relay systems which could increase the efficiency of CB communications tremendously.

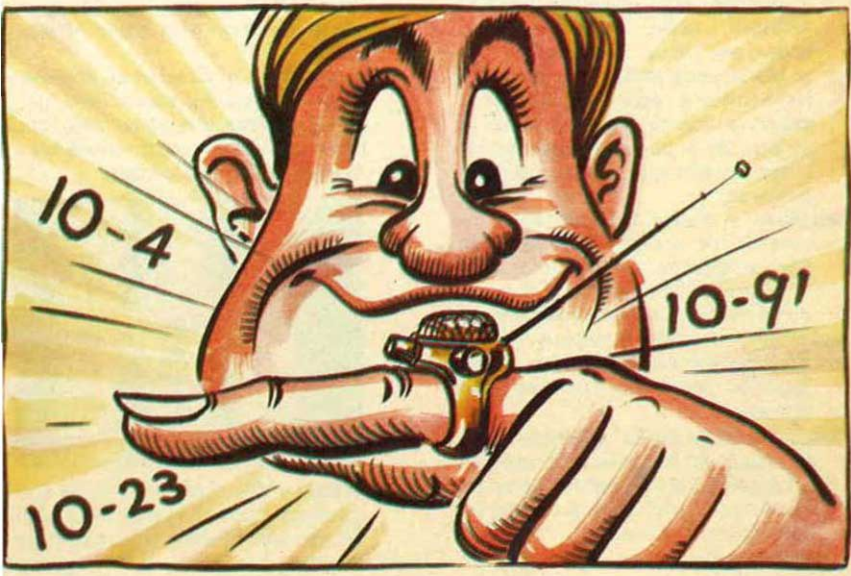
With a repeater your transmitted signal is picked up by the repeater's receiver and simultaneously rebroadcast through the repeater's transmitter. A centrally located repeater station on a high building could make it possible to have excellent communications all over your town with considerably greater range than is now possible through direct station-to-station communications.

Selective Calling. Selective calling is a technique which is available today. It is used by paging companies to activate a particular subscri-

ber's paging unit without disturbing other subscribers. In CB it could be used in much the same way — a base could alert one or more specific mobile units, and the various mobile units could leave their sets in a standby condition until alerted by a message directed to them.

Antenna Design. Your two-way wrist radio would be pretty cumbersome if you had to use a 102" long CB antenna. Through the use of loading coils we can reduce the size of CB antennas considerably. Perhaps the antenna technology of the future will make it possible to reduce the size of a CB antenna to just a few inches.

And More! The possibilities are practically unlimited for the potential use of CB radio. Ond day you may be able to use a pocket, wrist or even ring size two-way radio to instantly communicate with any other station in your area — perhaps even in the world! Science Fiction? Perhaps, but today's science fiction gadget has a way of becoming tomorrow's household appliance.



IX. Glossary

AC—Abbreviation for alternating current. 120 VAC is 120 volts of alternating current. Normal house current.

AC/DC—Abbreviation for alternating current or direct current. Term is applied to equipment designed to operate on either kind of current, such as base/mobile transceivers which may be powered from 120 VAC or 12 VDC.

align—To adjust or tune a circuit to the proper frequency.

AM—Abbreviation for amplitude modulation, which is the mode used to convey voice signals in most CB communications. The other mode used in CB is single sideband.

amateur radio—Another radio communications service licensed by the DOC. Amateur radio operators, also known as "Hams", must pass a test of Morse code proficiency, electronics theory and regulations in order to obtain a licence. Amateur radio is strictly for hobby and experimental purposes and may not be used for business.

amplifier—A device or circuit which increases the strength of a signal. In CB transceivers, an amplifier is used to increase the strength of the received radio signal to an audible level.

antenna—A metallic structure, usually an arrangement of rods or wires, used for receiving or radiating radio signals.

ANL—Abbreviation for automatic noise limiter. An ANL circuit is used in CB transceivers to reduce noise or interference such as that caused by auto ignition systems.

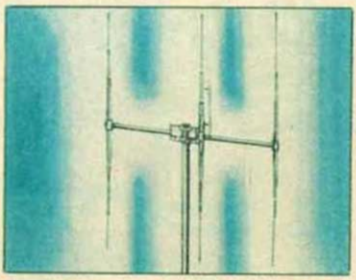
automatic gain control— A circuit which automatically maintains a signal at a certain desired level even though the source, or input signal may vary in level.

background noise—Noise heard along with the desired sound signal. Usually caused by atmospheric interference.

band— A range of frequencies between two definite limits. For example, the broadcast radio band includes all frequencies from 535 to 1605 kHz. Citizens Band includes the frequencies between 26.965 and 27.255 MHz.

base station—A CB radio station, usually installed in a fixed location and operated from 120 VAC. Also can be a station used as the central or control station of a group of stations.

beam antenna—A directional antenna which focuses the transmitted signal in a narrow directional path and receives signals from the same narrow segment of the horizon.



call letters— The system of letters and numbers assigned to each individual CB licensee to identify transmitting stations.

carrier—A radio wave of constant amplitude, frequency, and phase at a particular frequency of operation. This radio wave is altered by interruption or changes in amplitude to "carry" the intelligence (voice signal) to be transmitted.

CB—Abbreviation for Citizens Band.

channel—A specific frequency used for communication. In CB, each frequency is assigned a designated channel number. For example, channel 9 is 27.065 MHz.

channel selector—Switch or dial used for selecting the specific channel being used.

clarifier control—A fine tuning control used on SSB transceivers to allow you to tune the receiver frequency slightly so that you are receiving the station exactly on frequency.

coax—Abbreviation for coaxial cable. A two-conductor cable or transmission line, in which one conductor completely surrounds the other and acts as a shield for the inner conductor. Used for connecting the antenna to the transceiver.

communication—The transmission of information from one point, person, or piece of equipment to another.

communications receiver—A radio receiver designed for reception of radio signals from stations operated primarily in the 535 to 1605 kHz broadcast band and 1 to 30 MHz shortwave radio bands.

crystal—In CB, a piezoelectric natural (quartz) or synthetic crystal that has been ground to the proper size to produce a natural vibration at the desired frequency and to produce that frequency when set into vibration. Crystals are used to control the frequency, or channel, on which a CB set operates.

crystal control—The use of a crystal to maintain a transmitter (or receiver) on its assigned frequency.

DC—Abbreviation for direct current. Batteries are a source of direct current, such as the 12 VDC battery used in most cars and trucks.

delta tuning—A fine tuning control used on some transceivers to allow you to tune slightly off frequency for better reception of a station which may be transmitting slightly above or below the correct frequency.

directional antenna—An antenna which radiates or receives signals more effectively in some directions than others. See also ***beam antenna.***

DOC — Abbreviation for Department of Communications. The DOC is a governmental board which has the power to regulate all electrical communications systems originating in Canada.

dual conversion—Type of receiver circuit design which provides greater selectivity.

effective radiated power—Abbreviated ERP. The antenna input power times the gain of the antenna expressed in watts. A measurement of effective signal power being radiated from an antenna. It may be more or less than the input provided by the transmitter.

FET—Abbreviation for field effect transistor. A semiconductor whose application is similar to a vacuum tube. Typically used in high-performance receivers.

field strength meter—A measuring instrument for determining the relative strength of radiated energy (field strength) from a transmitter.

filter—A selective network of resistors, capacitors, crystals, inductors or combinations of these elements which allow certain frequencies or signals to pass easily while opposing the passage of others. Filters are used, for example, to block noise impulses or signals while allowing the passage of the desired radio signals.

frequency synthesizer—Circuit used in CB transceivers to provide full 23-channel operation without the need for 23 separate pairs of crystals. The frequency synthesizer uses various combinations of several crystals to achieve full 23-channel capability. See text, Chapter II.

fuse—A protective device, usually a short piece of wire which melts and breaks when a current which exceeds its rated value flows through it.

fuse block—An insulating base on which fuse clips or other contacts are mounted.

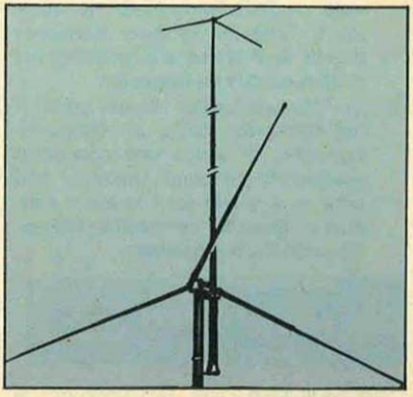
gain—Any increase in power.

gain control—A device for varying the gain of an amplifier or system.

ground—A metallic connection with the earth to establish a zero electrical potential.

grounded—Connected to earth or to some conductor which takes the place of earth.

ground-plane antenna—A nondirectional vertical antenna with metal radials which create an artificial ground thus permitting the antenna to be mounted above the actual,or earth, ground.



ground wave — A radio wave which travels along the earth's surface, as opposed to waves reflected from the upper atmosphere (sky waves).

ham — Slang for amateur radio operator.

Hertz — A term meaning cycles per second. Abbreviated Hz.

high frequency — The frequency band between 3 and 30 MHz which includes Citizens Band. Abbreviated hf.

ignition noise — Interference produced by sparks or other ignition discharges in a car, motor, furnace or other type of ignition system.

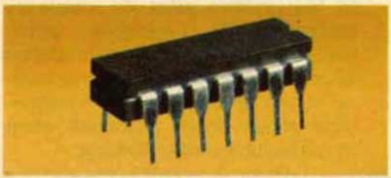
impedance — The opposition a circuit offers to the flow of alternating current.

impedance match — The condition in which the impedance of a component or circuit is equal to another impedance to which it is connected. For example, the antenna, coaxial cable and transceiver of a CB station. With proper impedance match there will be maximum transfer of energy.

input — The driving force applied to a circuit or device. Also, the terminals (or other connection) where the driving force may be applied to a circuit or device.

input power — The amount of DC power (wattage) applied to the final or RF power output stage of a transmitter.

integrated circuit — Abbreviated IC. A subminiature device which contains a combination of interconnected circuit elements. Integrated circuits are used in CB equipment for both their size and reliability.



interference — The disturbance of reception of desired signals by undesired or stray signals. Interference may come from atmospheric conditions, electrical devices such as ignition systems or from other stations operating on the same channel.

jack — A socket to which a wire (or wires) is connected to one end and a plug is inserted into the other. Your CB microphone has a plug which is inserted into the microphone jack on your transceiver.

kHz — Abbreviation for kilohertz. 1000 cycles per second.

kilo — Prefix meaning 1000.

lead — A wire to or from a circuit.

LED — Abbreviation for light emitting diode. Used for panel lights and digital readouts in electronic equipment.

line filter — A device inserted in series with the power line to block noise or other interference from devices such as motors.

line of sight — The distance from an elevated point to the optical horizon, or another elevated point which may be beyond the optical horizon.

load — Any energy or power consuming device which is connected to another device that is supplying power or energy to the first device. An antenna serves as a load for the power output of a CB transmitter.

loading coil — A coil of wire used in many antennas which serves to electrically lengthen the antenna while permitting it to be shorter physically

mega — Prefix meaning one million.

meter — An electrical or electronic measuring device.

MHz — Abbreviation for megahertz. One million cycles per second.

microphone — A device for converting sound waves into an electrical signal.

milli — Prefix meaning one thousandth.

mobile radio — A two-way radio that is either portable or installed for use in a car, boat, truck or other vehicle.

modulate — The placing of voice information on a radio signal.

modulation indicator light — Lamp on a CB transceiver which gives a visible indication of modulaton. See text, Chapter II.

Multimeter — A test instrument with suitable switching facilities to measure voltage, current and resistance. Also called a volt-ohm-milliammeter (VOM).

negative — Usually the grounded side of a battery. Also referred to as the minus or "—" side.

nickel-cadmium cell — A battery cell with a positive electrode of nickel and oxide and a negative electrode of cadmium. Often used in walkie-talkies or other devices where rechargeable batteries are desired.

noise blanker — A circuit which momentarily silences the receiver (without a perceptible loss of audio intelligence) during brief noise bursts. Superior in performance to an automatic noise limiter.

noise limiter — See ANL.

omnidirectional antenna — An antenna which radiates or receives signals equally well in all directions.

PEP — Abbreviation for peak envelope power. The actual maximum power developed by a single sideband transmitter on signal envelope.

phase lock loop — Circuit used with digital frequency synthesizers for maximum stability of frequency. See text, Chapter II.

piezoelectric — The property exhibited by the crystals used for frequency control in CB transceivers which causes a voltage to be produced when they are subjected to mechanical stress, and conversely, a mechanical stress to be produced when they are subjected to voltage.

plug — A device attached to the end of a cord. When inserted in a jack, it establishes a connection between the conductor or conductors.

positive — The plus "+", or usually ungrounded side of a battery.

power output — The power in watts delivered by a transmitter to the antenna. In CB this is limited to 4 watts maximum on AM, 12 watts PEP on SSB. See text, Chapter II.

power supply — A unit or circuit which supplies electrical power to another unit or to the balance of a circuit. In CB transceivers the power supply is an integral part of the circuitry.

PTT — Abbreviation for press-to-talk or push-to-talk. A transmit/receive switch, usually a button mounted on a microphone, which when pressed puts the transceiver in the transmit mode, when released in the receive mode.

Q signals — A system of three letter abbreviations starting with the letter Q. Each code is an abbreviation for a complete statement. For example, QRT means "stop transmitting", QRX means "stand-by". Can also be used as questions.

radio — A general term referring to the use of electromagnetic waves. In particular, communication by electromagnetic waves transmitted through space.

radiocommunication — A term used to denote transmission of sound, pictures, signals, writing, etc. via radio.

radio frequency — Any frequency between an audio sound and the infrared light portion of the spectrum. Abbreviated rf.

radio horizon — The line beyond which direct radio waves cannot continue along the earth's surface. This distance is affected by atmosphere refraction; hence, it is not constant and does not necessarily equal the optical horizon.

radio receiver — A device for converting radio waves into sound.

radiotelephone — The complete radio receiver and transmitter (or transceiver) required at one station for voice radio communication.

range — The maximum distance at which reliable communications may be maintained.

receiver — A device equipped for reception of incoming electrically transmitted signals.

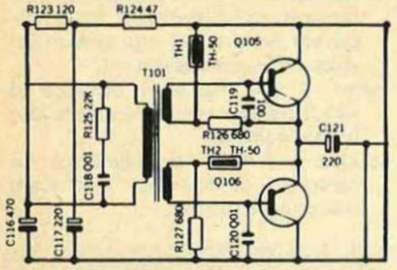
regulated power supply — A power supply in which the output voltage is held constant as the load or source is varied.

RF — Abbreviation for radio frequency.

rig — Slang for transmitter or transceiver.

scanner — A monitor receiver which scans, or sequentially samples a number of frequencies, or channels, for the presence of a signal.

schematic diagram — A line drawing of an electrical circuit in which the electrical connections and components are represented by graphical symbols.



SCHEMATIC DIAGRAM

selectivity — The ability of a receiver to reject transmissions from frequencies other than the specific one to which it is tuned.

sensitivity — In a receiver, the minimum input signal required to produce a specified output at a specified signal-to-noise ratio. A more sensitive receiver circuit will be able to detect, or receive, weaker signals than a less sensitive receiver.

series — A way of arranging components end to end so that current flowing through one component must flow through all others.

shielded cable — A cable in which the insulated conductor (or conductors) is enclosed in a conducting envelope which is grounded to reduce the effect of magnetic or electrical fields. See also ***coax***.

short circuit — Also called just "short". An abnormal relatively low-resistance connection between two points of a circuit. Usually accidental or unintentional, as when two wires touch that should be separated.

shortwaves — Radio frequencies which fall above the broadcast band and are used for long-distance sky-wave communications. Typically 3-30 MHz.

sidebands — The frequency bands on both sides of the carrier in which the voice intelligence is carried.

signal strength — The strength of the signal from a transmitter delivered at a specific location.

signel-to-noise ratio — A ratio of the magnitude of a signal to that of the noise.

single sideband — A transmission system in which only one of the sidebands produced during modulation is transmitted and the other is suppressed. The carrier wave is also suppressed. See text, Chapter II.

sky wave — A radio wave that has been reflected from one of the layers of the ionosphere.

S-meter — A meter used in som CB transceivers to indicate the strength of the received signal. A signal strength meter.

S/RF meter — As above, and also provides an indication of transmitter power output.

solid-state — Devices that can control current without moving parts, heated filaments, or vacuum gaps. Semiconductors and transistors are typical solid-state devices.

speaker — A device which converts electrical signals back into sound.

speech amplifier — A voltage amplifier between (or sometimes built into) the microphone and the transmitter

speech clipper — An amplitude limiting circuit to limit the peaks of a speech frequency signal used in AM voice transmitters to maintain a high average percentage of modulation.

squelch circuit — A circuit in a receiver for reducing the background noise in the absence of signals.

SSB — Abbreviation for single sideband.

static — Noise heard on a radio receiver due to atmospheric electrical disturbances such as lightning or man-made interference from electric motors, lights, etc.

static charge — The accumulated electrical charge on an object.

static discharge unit—A grounded protective device consisting of a spark gap and attached to a lead-in to allow built-up excessive static electricity on the antenna to flow across the gap to ground rather than along the lead in to the radio equipment.

surface wave — A ground wave which travels along the surface of the earth.

switch — A mechanical or electrical device which breaks or completes a path for electrical current.

SWR — Abbreviation for standing wave ratio. SWR is measured to determine how well matched a CB system (transceiver, antenna, antenna cable) is. A low SWR measurement (1.5:1 or better) is an indication that the system is operating efficiently, with a minimum of loss.

SWR bridge—Meter used for measuring SWR.

10 code—Numbered abbreviations prefixed by "10" used to convey specific messages. For example, 10-20 stands for "location", 10-4 means "affirmative", or "message received" Can also be used as questions. See Appendix A.

terminal—A point for the connection of two or more conductors.

traffic—Messages handled by communications stations.

transceiver—A combination transmitter and receiver housed in a common cabinet and employing some common circuit components for both transmitting and receiving. See text, Chapter II.

transistor—A solid-state device made from semiconductor material which is typically used to amplify signals.

transmit—To send a message, program, or other information from one location to another.

transmitter—The equipment used to generate and amplify an rf carrier signal and modulate this carrier with intelligence.

tuning—The adjustment of the frequency of a circuit or system to obtain optimum performance.

TVI—Abbreviation for television interference. Usually the reception of CB or other signals on a television receiver, interfering with TV reception. Most often the result of poor TV design, rather than a malfunctioning CB radio.

two-way communication—Communication between two radio stations, each having both transmitting and receiving equipment.

VHF—Abbreviation for very high frequencies, the band of frequencies between 30 and 300 MHz.

volt—The unit of measurement for electromotive force.

volume—The intensity of a sound.

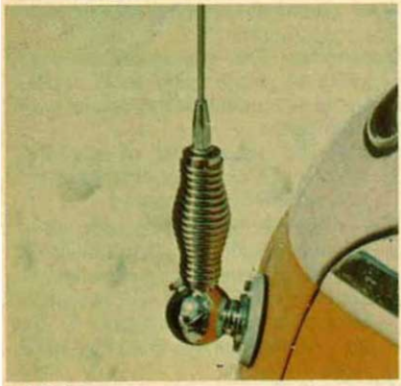
volume control—A variable resistor used to adjust the loudness of a radio receiver.

walkie-talkie—A two-way radiocommunication set designed to be hand carried and operated. See text, Chapter II.

watt—The unit of measurement for electrical power.

wave—A physical activity that rises and falls, or advances and retreats, periodically as it travels through a medium, such as a radio wave.

whip antenna—A simple vertical antenna such as that used on cars, trucks or other vehicles.



APPENDIX A

THE "10" SIGNALS

Code No.	Meaning
10-1	Receiving Poorly
10-2	Receiving Well
10-3	Stop Transmitting
10-4	OK, Message Received
10-5	Relay Message
10-6	Busy, Stand By
10-7	Out of Service, Leaving Air
10-8	In Service, Subject To Call
10-9	Repeat Message
10-10	Transmission Completed, Standing By
10-11	Talking Too Rapidly
10-12	Visitors Present
10-13	Advise Weather/Road Conditions
10-16	Make Pickup At .....
10-17	Urgent Business
10-18	Anything For Us?
10-19	Nothing For You, Return To Base
10-20	My Location Is .....
10-21	Call By Telephone
10-22	Report In Person To ....
10-23	Stand By
10-24	Completed Last Assignment
10-25	Can You Contact .....?
10-26	Disregard Last Information
10-27	I Am Moving To Channel.....
10-28	Identify Your Station
10-29	Time Is Up For Contact
10-30	Does Not Conform To DOC Rules
10-32	I Will Give You A Radio Check
10-33	Emergency Traffic At This Station
10-34	Trouble At This Station, Help Needed
10-35	Confidential Information
10-36	Correct Time Is .....
10-37	Wrecker Needed At.....
10-38	Ambulance Needed At ....
10-39	Your Message Delivered
10-41	Please Tune To Channel ....
10-42	Traffic Accident At .....
10-43	Traffic Tieup At .....
10-44	I Have A Message For You (or .....
10-45	All Units Within Range Please Report
10-46	Assist Motorist
10-50	Break Channel .....
10-60	What Is Next Message Number?
10-62	Unable To Copy, Use Phone
10-63	Net Directed To .....
10-64	Net Clear
10-65	Awaiting Your Next Message/Assignment
10-67	All Units Comply
10-70	Fire At .....
10-71	Proceed With Transmission In Sequence
10-73	Speed Trap At .....
10-75	You Are Causing Interference
10-77	Negative Contact
10-81	Reserve Hotel Room For ....
10-82	Reserve Room For .....
10-84	My Telephone Number Is ....
10-85	My Address Is .....
10-89	Radio Repairman Needed At ....
10-90	I Have TVI
10-91	Talk Closer To Mike
10-92	Your Transmitter Is Out Of Adjustment
10-93	Check My Frequency On This Channel
10-94	Please Give Me A Long Count
10-95	Transmit Dead Carrier For 5 Seconds
10-99	Mission Completed, All Units Secure
10-200	Police Needed At .....

Note: Any 10-code signal may be reversed by stating it as a question. For example, 10-20? would mean "What Is Your Location?" or 10-36? "What Is The Correct Time?"

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20-Foot RG58/U Cable*.... 278-966
50-Foot RG58/U Cable 278-971
50-Foot RG8/U Cable 278-970
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5-Foot RG8/U Cable 278-969

RG58/U Cable

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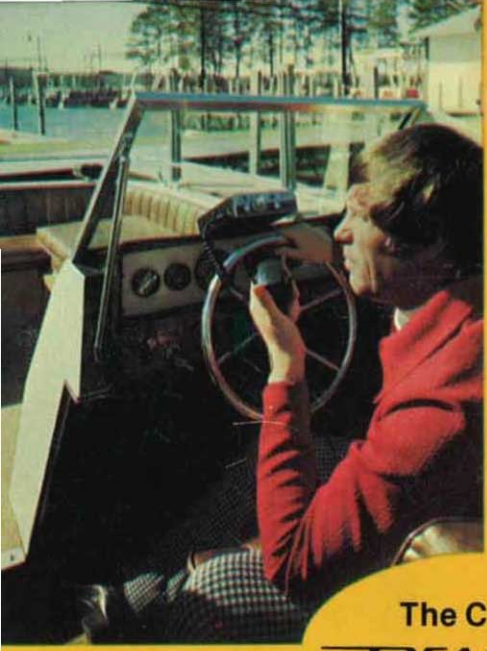

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