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## WHATEVER HAPPENED TO CITIZENS BAND RADIO? Wireless Throwback Or Still A Viable Communication Alternative?

I was talking with some friends about ham radio and some other wireless communications methods recently and someone asked, “Whatever happened to Citizens Band (CB) radio?” One of the younger guys in the group asked “What is CB radio?” Whoa! I guess I forgot how old a technology this is. It certainly is not as visible as it used to be. In any case, I had to explain that CB radio is a two-way radio communications system sanctioned by the Federal Communications Commission (FCC) that does not require a license. Anyone can use it if you buy the licensed and approved equipment. In case you didn’t know, CB radio is still around. If you haven’t tried it, you just might find it fits one of your communications needs.

### CB BACKGROUND

The FCC established a personal communications service back in the late 1940s. Most of the frequency assignments were in the 450 MHz UHF range and it never became popular. In 1958 and in the 1960s, the 27 MHz spectrum was assigned to the newly created Class D radio service. This is what has become known as CB radio. The 27 MHz spectrum (also known as 11 meters) was initially divided into 23 fixed frequency channels. Early transceivers used tubes and had to use two crystals for each channel: one for the transmitter and another for the receiver’s local oscillator. Crystals were expensive back then, so many of the lower priced units only covered a few channels.

The 1960s brought about the solid-state movement, so CB radios quickly adopted transistor circuitry making them smaller, less expensive, and easily battery operated. Phase-locked loop (PLL) frequency synthesizers came along making it possible to synthesize all channels from one or two crystals. Later, the FCC opened up more channels, making a total of 40 available. These are the channels used today (see **Table 1**).

Incidentally, while all channels are used, some are

much more popular and useful than others. Channel 9 is an emergency calling frequency. It is not used for regular conversation, but instead is used only when someone needs help. Some police and highway patrol units monitor it on a regular basis. Channel 19 has become a general calling frequency for anyone wanting to establish a

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	26.965	21	27.215
2	26.975	22	27.225
3	26.985	23	27.255
4	27.005	24	27.235
5	27.015	25	27.245
6	27.025	26	27.265
7	27.035	27	27.275
8	27.055	28	27.285
9	27.065	29	27.295
10	27.075	30	27.305
11	27.085	31	27.315
12	27.105	32	27.325
13	27.115	33	27.335
14	27.125	34	27.345
15	27.135	35	27.355
16	27.155	36	27.365
17	27.165	37	27.375
18	27.175	38	27.385
19	27.185	39	27.395
20	27.205	40	27.405

Table 1

connection. Usually, those who link up switch to another clear channel.

CB radio really became popular in the 1970s. It was initially adopted by long distance truckers who wanted to know about gasoline sources, speed traps, heavy traffic, accidents, and the like. Back then, there was a gasoline shortage and a 55 MPH highway speed limit that drove the truckers nuts. CB radio really made it easier for all of them. Many other people put CBs in their cars and connected with the truckers on long highway trips.

CB radio became a major hobby. It was for those who wanted to be amateur radio operators but didn't want to learn the code or electronics to pass the FCC exams. The FCC issued licenses and call signs back then, but dropped both after it could not keep pace with the millions that wanted them. The license requirement and call signs were dropped. That led CB operators to adopt a name or "handle" that could identify them and present a radio personality.

CB was also popularized by many movies and songs back in the 1970s. Movies like *Smokey and the Bandit*, TV shows like *Dukes of Hazzard*, and songs like *Convoy* made CB a real phenomenon. And don't forget all the colorful expressions like "good buddy," "breaker, breaker," plus the 10 codes like 10-4 (received clearly) and 10-20 (location) were extremely popular.

The CB frenzy eventually faded, but it still continued to be popular. Over the years as new technology has come along, CB has now become a secondary communication choice, if it is known at all. There are so many other communications options today, CB has become an anachronism.

## CB TECH

CB radios come in two basic form factors: mobile units for under-dash mounting and handheld units. **Figure 1** shows some typical units. The mobile units take their power from the car battery, while the handhelds have an internal rechargeable battery. The mobile units rely on a rather large (six to 10 feet) whip antenna, whereas the handhelds have their own telescoping whip or "rubber ducky" antenna. Some companies still make a basestation unit with a built-in AC power supply.

■ **FIGURE 1.** Cobra Electronics Corporation ([www.cobra.com](http://www.cobra.com)) was one of the earlier suppliers of CB radios, and they are still in the business. Some of their popular products are the HH38WXST handheld which includes a weather radio and their 29 NW LTC Classic mobile unit. Check your local retailers to buy.



The basic transmission mode is plain old amplitude modulation (AM). A more sophisticated version uses single sideband (SSB) — a form of AM that uses only one sideband to conserve spectrum space. Maximum output power to the antenna is limited to four watts for AM and 12 watts peak envelope power (PEP) for SSB. The receivers are superheterodynes and all 40 channels are frequency synthesized. Prices run from about \$50 to \$150 for a typical unit, making CB one of the most affordable forms of two-way radio for personal or business use.

As for radio wave propagation, the 11 meter band has some unusual characteristics. It is only good for a one to five mile range in local coverage. However, frequencies in the 27 MHz range use sky waves to communicate over huge distances. Such waves go up to the ionosphere — an ionized region miles above the earth, where they are refracted or bent back to earth many miles away. Such propagation permits worldwide communications even with low power. This makes coast to coast communications possible, not to mention contacts with CB operators in other countries that use those frequencies. However, be forewarned. The FCC Part 95 rules do not permit contacts beyond 155 miles.

## THE FRS ALTERNATIVE TO CB

FRS means Family Radio Service — another personal communications service created by the FCC. It uses the 460 MHz UHF spectrum and (like CB) specific channel frequencies are assigned (see **Table 2**).

Channels 8 through 14 are strictly for FRS use, but Channels 1 through 7 are shared with the General Mobile

Channel Number	Frequency (MHz)
1	462.5625
2	462.5875
3	462.6125
4	462.6375
5	462.6625
6	462.6875
7	462.7125
8	467.5625
9	467.5875
10	467.6125
11	467.6375
12	467.6625
13	467.6875
14	467.7125

**Table 2**

Radio Service (GMRS) — a licensed service available to business.

Virtually all FRS radios are handhelds that are battery powered. FRS radios use frequency modulation (FM), so have better noise immunity and fidelity than CB. The transmit power is restricted to 0.5 watts. Furthermore, the antenna must be affixed to the unit. The low power and antenna restrictions limit practical range to less than a mile. With a clear line-of-sight path, several miles are possible. Mountain tops and high buildings make good platforms for long range communications. UHF

signal propagation is LOS and any path blockage by walls, buildings, trees, cars, or whatever severely limits range. The units are best used for short distances indoors or out.

The FRS radios serve a different purpose than CB radios. They are great for just keeping in touch in close situations. Car to car, shopping centers, stadiums, parks, and other large areas make it possible for people to stay in contact. Boating is another use.

You can get a pair of FRS transceiver handhelds for less than \$50 at RadioShack and other electronic dealers.

## THE DECLINE OF TWO-WAY RADIO

I just recently got out my RadioShack CB handheld and recharged it. I tried listening on all the channels and got little for my effort. I heard a few weak signals on Channel 11 but nothing on Channel 19. I suspect my small rubber ducky antenna is part of the problem. A longer, higher outdoor antenna would bring in more traffic, I think. The band was essentially deserted. But then again, that is a good thing as it is open for business. Most CB units (like my handheld) have a VHF weather radio built in. I was able to hear the local weather station loud and clear. Check your local RadioShack for both CB and FRS radios.

While CB and FRS radios are still used, their presence is not as great as it once was. Bet you can guess why — cell phones. Pretty much everyone carries one these days and they basically cover our personal communications needs. However, every now and then, a two-way radio makes sense so keep it in mind when you need to communicate. And remember, CB can still be a hobby of sorts. The good thing about these services is that the equipment is cheap and available to play around with. So go ahead and give them a try, good buddies. 10-4. **NV**



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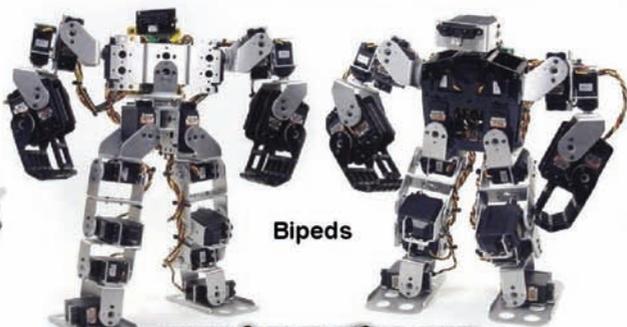
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