

LEO SANDS'

Complete Guide to CB Radio

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Leo G. Sands



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THE SCOPE AND PRACTICAL VALUE THIS BOOK OFFERS

The Citizens Band (CB) Radio Service is the largest of all radio communications services. There are now over 14,000,000 CB licenses operating an estimated 35,000,000 CB transceivers. It was on September 11, 1958 that the FCC established the Class D Citizens Radio Service in the 27-MHz band which had been the 11-meter Amateur Radio Service band. It was the opening up of the 27-MHz band that caused citizens radio to take off. The 27-MHz band has become known as "the citizens band." Way back in 1948, the FCC established the Citizens Radio Service in the 460-470 MHz UHF band. But, because of the high cost of adequate equipment and the inadequacy of low cost equipment for that band, there was very little interest shown by the "citizens."

Because of the millions of CB sets in use and the hundreds of thousands of new ones being placed into service each month, there will be a growing need for CB repair service and expanding opportunities for employed and self-employed CB service technicians.

There have been many changes in CB equipment, particularly in the last few years, and they are all covered in this book. While there could have been a need for servicing CB sets that were made before 1974, their further use is prohibited by the FCC. As of November 23, 1978, the use of CB transceivers that were not type accepted by the FCC after November 24, 1974, is prohibited. This removes most tube-type CB sets and many of those operable on fewer than 23 channels, from the service technician's market.

All CB sets that were not type accepted and certified by the FCC after September 10, 1976, may no longer be sold by dealers or individuals. Since no 23-channel CB sets were type accepted after that date, it means that only 40-channel CB sets and some walkie-talkies operable on fewer channels may now be sold.

The 40-channel CB sets employ a PLL (phase locked loop) frequency synthesizer for generating transmitter and receiver frequencies. Most have an LED (light emitting diode) digital channel display. Some of

the more sophisticated CB sets employ microprocessors to automate various operating functions. Many have the operating controls and channel indicator built into the microphone assembly.

Before the introduction of solid state CB transceivers, it was relatively easy to diagnose and repair the CB sets that used tubes (instead of transistors) and point-to-point wiring could be traced with less difficulty. All of the components could easily be identified and replaced when necessary. Now, most of the components are mounted on printed circuit boards. The circuitry can be difficult to trace, and locating and replacing a defective component may require more time than the customer is willing to pay for. There are, however, some basic components, such as RF power amplifier transistors, that are very vulnerable to failure and can be replaced quite easily.

As a result of the public interest in autosound, many AM/FM auto radios, and even some tape units, now contain a CB transceiver. This broadens the horizons of the CB service technician, since these units will require expert repair service and careful installation work.

Another area that should offer opportunities for technicians is the installation and sale of new, and replacement, CB antennas. To obtain optimum performance, a mobile CB antenna usually requires tuning at the time of installation. Now that the FCC allows directional antennas to be installed on a tower up to 60 feet above the ground, there will be a growing demand for technicians to install elaborate base station antenna systems, including antenna rotators.

Eliminating interference caused by CB transmitters to TV reception and to hi-fi systems is another area where the services of competent technicians will be required. Also, technicians are required to diagnose the causes of auto noise and to apply noise suppression measures.

There is also a trend toward more expensive and highly sophisticated CB transceivers. Several combination AM/SSB and some SSB-only base station transceivers, priced in the \$1000 or higher range, are in considerable demand. Their owners will insist on competent repair service.

Although not intended to be a "hobby" type service, CB radio, in fact, was dominated by hobbyists until the CB boom began. Then, the general public started buying CB sets so they could talk to truckers and other motorists while on the road, and talk directly with police officers in their patrol cars. Motorists who are not concerned about the technicalities of CB radio nevertheless are still in the majority. Most of them know nothing about electronics and must turn to experts for repair service.

The dedicated CB hobbyists are growing in number. They are the ones who buy the more expensive CB sets and who demand top performance. Since very few are technically competent, they too must turn to experts for repair service. While some may want to attempt minor repairs and adjustments themselves, FCC rules prohibit making *any* repairs to transmitter and receiver circuits, or any internal adjustments, except by persons possessing or working under the direct supervision of the holder of a First Class or Second Class Radiotelephone Operator license.

This book is arranged in encyclopedia form. Topics are listed in alphabetical order in the various parts of the book. Chapter 1 covers general information about the Personal Radio Services, licensing and basic reference data. Chapter 2 covers CB operating procedures which should be known to both CB users and service technicians. Chapter 3 covers technical standards and definitions of terms used in the CB industry. Chapter 4 describes various types of transceivers and their applications.

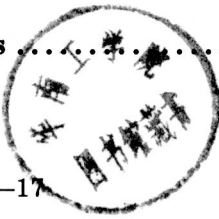
Technicians will find much valuable information in Chapter 5, which describes basic circuits used in CB transceivers. There are many circuit variations, but the principles are usually the same. Antenna and transmission lines are covered in Chapter 6. Important information about interference caused to, and by, CB sets is contained in Chapter 7. Base station and mobile unit installation practices are covered in Chapter 8, and accessories for CB systems are described in Chapter 9.

Information about servicing techniques and test equipment is contained in Chapter 10, much of which has not been published previously in any single volume. Performance measurement and testing procedures are covered in detail.

Of great importance is the information contained in the appendices . . . FCC technical regulations applicable to CB radio and the newly adopted "plain English" CB operating rules. Possession of the latter by all CB licensees is required by the FCC.

To use this book, select the chapter of interest to you, and scan the pages for the topics, listed in alphabetical order, that you want to read about. Refer to it whenever you need specific, helpful information. It can be of great value to you and should enable you to make better, more rewarding use of your interest in CB radio.

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1

THE PERSONAL RADIO SERVICES

Until the Citizens Radio Service was established, the use of two-way radio was limited to government agencies, emergency services and public utilities, and Amateur Radio Service licensees (hams). Personal communication, except through the facilities of communications common carriers was available only to hams, who must pass an examination for an operator license. Although the Citizens Radio Service was established in 1948, it was not until 1958 that the FCC established the 27-MHz citizens band. The same year, the FCC expanded the use of non-personal two-way radio communication to all types of business enterprises. No operator license is required by users of personal radio communication equipment (except for hams).

CB CHANNELS

There are 40 CB channels within the 26.96–27.41 MHz band, starting at 26.965 MHz (Channel 1) and ending with 27.405 MHz (Channel 40). These 40 channels are listed in Table 1-1. These channels are spaced 10 kHz apart with the exceptions of Channels 3 and 4, 7 and 8, 11 and 12, 15 and 16, and 19 and 20, which are separated by the Radio Control channels 26.995 MHz, 27.045 MHz, 27.095 MHz, 27.145 MHz, and 27.195 MHz, respectively. Channel 22 (27.225 MHz) is followed by Channels 24 and 25 (27.235 MHz and 27.245 MHz), and then by Channel 23 (27.225 MHz). From Channel 26 (27.265 MHz) through Channel 40 (27.405 MHz), the channels are in order of frequency, spaced 10 kHz apart with no other channels between them.

The original 23 CB channels were first numbered 1 through 23 by the author of this book (in 1958). The FCC then adopted the same channel numbering system.

The channel selector of a 40-channel CB transceiver is arranged so