

SOUND BLASTER

The Official Book

Richard Heimlich with David M. Golden
Ivan Luk and Peter M. Ridge

THE ONLY
OFFICIAL BOOK

Sound
BLASTER

CREATIVE
CREATIVE LABS, INC.

Covers the Whole Sound
Blaster Family Including
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Sound Blaster 16 & the
Sound Blaster Multimedia
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Including*

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- *Dozens of Songs and Musical Jingles —
Jazz, Pop, Classics, and More*
- *Popular Sound Blaster Utilities
Including SPUTMON and BLASTER Master
That Will Turn Your PC Into a
Multimedia Machine*



*Rich Heimlich, David M. Golden,
Ivan Luk, and Peter M. Ridge*

Sound Blaster: The Official Book

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Sound Blaster: The Official Book

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*To our parents: Richard and Phyllis Heimlich,
Wayne and Victoria Ridge, Tony and Jenny Luk,
Jacqueline Golden and the memory of Robert Golden*

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Introduction

This is the most up-to-date and comprehensive book available on the Sound Blaster family of sound cards. It is also the only official Creative Labs guide. *Sound Blaster: The Official Book* is loaded with valuable information for the game enthusiast, the business person interested in multimedia, and software developers who wish to program their Sound Blaster.

About This Book

This book is very different from the all-too-typical computer book that rewrites the manufacturer's manual, providing little more than extra pictures, fancy formatting, and a few tips. We've plugged the gaps in your *Sound Blaster User Reference Manual* by delivering a wealth of information not found in your manual. Due to our unique relationship with Creative Labs, this book includes lots of previously unavailable information about the Sound Blaster and its software—information that you won't find anywhere else.

How this Book is Organized

This book is divided into five parts so that you can easily dive into the material you are most interested in.

Part I provides an overview of the Sound Blaster family of cards, including both a history and a description of the newest member of the family: the Sound Blaster 16 ASP.

- Chapter 1 takes you inside the Sound Blaster for a little anatomy lesson so you will understand what's going on in your fancy piece of hardware. We explain and compare every member of the Sound Blaster family, down to a description of the jumpers, connectors, and most significant electronic circuitry.

Part II, "Software Bundled with the Sound Blaster Family," is everything you need to know to fully exploit the software programs provided with your sound card.

- ❑ Chapter 2 (the first chapter in Part II) gives you a good leg up on the basics of sound with explanations of MIDI, General MIDI, FM synthesis, digital audio sampling, analog-to-digital and digital-to-analog conversion, and a host of other technical topics.
- ❑ Chapter 3 gives you tips and tricks for using the software toys that come with your Sound Blaster, such as Dr. Sbaitso and the Talking Parrot.
- ❑ Chapter 4 focuses on the command line utility programs for recording and playing back sound files, as well as for converting from one type of sound file to another.
- ❑ Chapter 5 fills in the gaps about VOXKIT, the sound editor that comes with Sound Blaster, and VEDIT2, the one that comes with Sound Blaster Pro.
- ❑ Chapter 6 is aimed at Sound Blaster Pro owners. It provides a comprehensive description of the programs for controlling the mixer, which is new to the Sound Blaster Pro.
- ❑ Chapter 7 is your reference guide for creating multimedia presentations with the software that comes with your sound card.
- ❑ Chapter 8 dives into facets of Sequencer Plus Pro, the MIDI sequencer software package that comes with the Creative Labs MIDI Kit. We have tried to cover the most common stumbling blocks for users of this MIDI music composition package.

Part III, "Using the Software Included with This Book," shows you how to get the most out of the utility programs bundled with this book: namely SPUTMON and Blaster Master. (SoundSculptor is briefly documented in Appendix E of this book.)

- ❑ Chapter 9 shows you how to use SPUTMON (short for Sputter Monitor) to attach sound effects or music to hundreds of events in your system. SPUTMON will let you do things like play a "scream" whenever you delete a file.
- ❑ Chapter 10 tells you how to use Blaster Master, a digital audio sound recorder and editor. Blaster Master lets you record speech or music, edit pieces, and even add special effects like fades and slowing your playback speed without changing the pitch.

Blaster Master is more flexible and powerful than the VEDIT2 editor that comes with the Sound Blaster Pro. Sound Blaster owners, who are

still working with the rudimentary VOXKIT editor bundled with their sound card, are in for a very pleasant surprise.

Part IV, "Hardware and Software Enhancements," presents a concise summary of many leading software and hardware products that can be used with your Sound Blaster. This section should give you the background to ensure that you are satisfied with any speakers or additional software you have purchased for your sound card.

- ❑ Chapter 11 provides short descriptions of well-known third-party software programs that work with the Sound Blaster family. Both commercial products and less expensive shareware programs are described, along with addresses and phone numbers so you can contact these companies. Don't forget to check out the coupons provided with *Sound Blaster: The Official Book* to see if you can buy one of these products at a reduced price.
- ❑ Chapter 12 provides information on how to select a speaker for your Sound Blaster and lists many of the companies who have a presence in this marketplace.

Part V, "Appendixes," contains a wealth of reference information, including the very latest information about the newest member of the Sound Blaster family, the Sound Blaster 16 ASP.

- ❑ Appendix A supplements the installation chapter of the Sound Blaster User Reference Manual, providing a complete step-by-step guide for installing the sound card. If you have any problems with the card installation—or problems later on, when using your card—either Appendix A or Appendix B, the troubleshooting section, will come to your rescue.
- ❑ Appendix B covers the most common problems encountered with Sound Blaster...and provides solutions, direct from the technical support staff at Creative Labs.
- ❑ Appendix C is a reference section for programmers. It contains detailed, register-level information for controlling the sound card hardware, as well as documentation for the SBSIM interface that provides a unified and simplified interface to the Sound Blaster.
- ❑ Appendix D describes the Sound Blaster 16 ASP. You'll get a glimpse into the next generation of sound card hardware and software—and you'll find out whether its time to upgrade!

- Appendix E contains a concise introduction to SoundSculptor, a fun utility for programming custom instrument sounds into the FM synthesizer. SoundSculptor is included with this book.



Note Because Blaster Master and SoundSculptor are graphically oriented programs, they will not run without a mouse.

Installing the Disk for Sound Blaster: The Official Book

The accompanying 3.5" 720K disk contains valuable software programs, as listed on the first page of this book. If your machine doesn't accept this size disk, call Osborne/McGraw-Hill, in Berkeley, California, at 1-800-227-0900 or 1-510-549-6600 (8:30 A.M. to 4:30 P.M., Pacific Time) for a replacement 5.25" 1.2M disk.

Before beginning the install process, read the README file on the *Sound Blaster: The Official Book* diskette. To do so, change to the drive that contains the disk and type **README** at the DOS prompt. Use the UP ARROW and DOWN ARROW keys to scroll through the information. When you're done reading, press the ESC key to return to the command prompt.



Note At various times during your installation of the *Sound Blaster: The Official Book* disk, you may be called upon to edit your AUTOEXEC.BAT or CONFIG.SYS files. See "Editing ASCII Files" in Chapter 2, "Basics of Sound and the Sound Blaster," of this book for information on editing these files or consult your favorite DOS manual.

Installation Requirements

The installation program and related batch (.BAT) files require DOS version 3.3 or higher and slightly more than 1.2 Meg (megabytes) of space on your hard disk. Before beginning your installation, note the following:

- INSTALL may be canceled at any time by pressing the ESC key. If you press the ESC key to exit the INSTALL program before it has finished, you will receive instructions to run SETUP as if you had completed the installation. Running SETUP at this point will produce unexpected results because only some, if any, of the disk will be on your hard disk. If this describes your situation, make sure that you have run the

INSTALL program to completion before searching for another solution to your problem. See the beginning of the troubleshooting section that follows for a cautionary note on rerunning INSTALL.

- ☐ SETUP.BAT must be run from the directory on which you installed your disk. For example, if you installed to the C drive, that directory will be C:\SBDISK. If you encounter a problem running SETUP, make sure that you are in the appropriate subdirectory.
- ☐ Should you have problems running SPUTMON, you may need to add a SHELL statement to your CONFIG.SYS file. If you can't run SPUTMON or the other programs provided on the disk, you may need to modify the PATH statement in your AUTOEXEC.BAT file. This is discussed in the troubleshooting section that follows.

How to Install the Disk

1. Place the disk into your floppy disk drive and close the drive door.
2. Type the letter of the disk drive that contains the *Sound Blaster: The Official Book* disk, followed by a colon, and then the word INSTALL. For example, if your disk is in drive B you would type **B:INSTALL**. Press **ENTER** and the first screen in the Install program will pop up.
3. The installation screen will ask you for the source of your disk, where you wish to install the disk from (default is the current floppy drive, the drive you specified in step 2). The installation program will also ask you for the target for your installation, the hard drive you'd like to install to (default is the C drive).



Note If you want to install to another drive, such as the D drive, press the **TAB** key to highlight the drive letter to the right of "to Hard Drive." Then type the desired drive letter.

Now press the **F10** key to start the installation process. Follow the directions on the next screen, pressing **ENTER** to continue the installation or **ESC** to cancel.

4. When the INSTALL program finishes it will ask you to press the **ESC** key. Press **ESC**.

You will be asked whether C:\SBDISK should be added to the PATH statement in your AUTOEXEC.BAT file. You should answer yes. Answering yes will modify AUTOEXEC.BAT and save the original file as AUTOEXEC.SB. You may also be notified that the FILES statement in your CONFIG.SYS file needs to be updated. You should answer yes. Answering yes will modify CONFIG.SYS and save the original version

as CONFIG.SB. The INSTALL program will then state that installation is complete—but you're not quite done yet.

5. You should now see a screen titled "***IMPORTANT ***" that asks you to run SETUP.BAT. Type **SETUP** at the \SBDISK> prompt (step 4 should have left you in the \SBDISK directory on your target drive) and press **ENTER** to run the setup program. This action will bring up the SB Environment Configuration Screen.
6. You will be prompted by SETUP for the target drive (the drive you'd like to install to); the default is C. Press **ENTER** to use the default selection.



Note If you're installing to a disk other than the C drive, you should see that drive letter here. Press **ENTER** to install to that drive.

7. SETUP now prompts you for the appropriate I/O Base Address. The default address is 220. Press **ENTER** to accept this, or type the correct number if you didn't use the default settings when you originally installed your Sound Blaster card. SETUP then asks for the appropriate IRQ interrupt (IRQ). The default is 7. Press **ENTER** to accept this, or type the correct number. SETUP now displays the settings you just entered, and asks you if this is correct. Press **Y** to go onto the next step, or press **N** to revise these settings.



Note If you don't know your Sound Blaster's I/O address and/or the IRQ interrupt (IRQ), check Appendix A for a description of Sound Blaster's test programs to determine the settings. Most sound cards are installed with the default settings of 220 for address and 7 for IRQ. To quit step 7, press **Q** when prompted by the "Is this correct (Y or N):?" question.

8. SETUP will then ask you whether you want SPUTMON loaded automatically when you start your computer. Press **Y** to add instructions for SPUTMON to your AUTOEXEC.BAT file so SPUTMON will always be loaded when you turn on your computer. If you press **N** you can still run SPUTMON, but you must enter the commands by hand, as explained in the section that follows on SPUTMON.



Note If you are connected to a network or have a lot of TSR (Terminate and Stay Resident) programs or drivers loaded in your machine, you should answer no, **N**, when asked if you want SPUTMON loaded automatically. This will help to eliminate potential TSR conflicts that you may encounter when running SPUTMON.

9. You've now finished the disk installation. Remove the disk from your floppy drive and reboot your machine by pressing the following keys at the same time: CTRL, ALT, and DEL.

How to Install and Run the Programs

Batch files in the \SBDISK directory make it easy to access the programs provided with your book.



Note The installation program modifies the AUTOEXEC.BAT file, adding \SBDISK to the PATH statement for locating files. If you've already rebooted your computer, you can skip step 1 in the instructions below.

Blaster Master

1. Switch to the SBDISK directory by typing **CD\SBDISK** and then press ENTER.
2. Type **BMASTER** and then press ENTER.

Blaster Master may refuse to run for various reasons. Potential problems and their remedies are as follows:

- ☐ Blaster Master requires a mouse to function. If it can't find one, it refuses to start.
- ☐ Blaster Master checks to see that a Sound Blaster card is installed. Its automatic scanning feature should detect your sound card automatically. If it doesn't, and you know that your card works correctly, check that you have a SET BLASTER= environment variable in your AUTOEXEC.BAT file. See the section "Setting the Blaster Environment" in Chapter 10, "The Blaster Master Sample Editor," for more information on this topic.
- ☐ If you get the message "Not Enough 640K Memory Free" when you try to start Blaster Master, see the section by that name in the troubleshooting section of Appendix B of this book.
- ☐ If you're having problems with Blaster Master that cause your machine to crash, you probably need to make more memory available by removing TSRs and unnecessary drivers. This is also discussed in the troubleshooting section in Appendix B of this book.

SPUTMON

1. Switch to the SBDISK directory by typing **CD\SBDISK** and then press **ENTER**.
2. To turn on SPUTMON, if it isn't currently active, type **SPUTON** and press the **ENTER** key. To turn off SPUTMON, type **SPUTOFF** and press the **ENTER** key.



Note Don't be surprised if you see the DOS command prompt twice when SPUTMON is running. It is executing a command that you cannot see at the first prompt.

If SPUTMON doesn't work for you, please see the section "Troubleshooting Your Sound Blaster: The Official Book Disk Installation," later in this introduction.

Loading SPUTMON Manually

The instructions above assume you've told the installation program to install SPUTMON automatically. If you answered no, **N**, preventing the install program from adding the SPUTMON instructions to your AUTOEXEC.BAT file, you can still load and run SPUTMON. When you're ready to install SPUTMON, type the following commands at the command prompt. Press the **ENTER** key after you type each line:

```
\SBDISK\SBCNV /q  
\SBDISK\SPUTON
```

SPUTMON will now be loaded and turned on until you reboot, turn the machine off, or give the SPUTOFF command to temporarily disable SPUTMON. The two command lines above are the same commands that the install program attaches to the end of your AUTOEXEC.BAT file.

SoundSculptor

1. Switch to the SBDISK directory by typing **CD\SBDISK** and then press **ENTER**.
2. Type **SS** and press **ENTER**.



Note SoundSculptor will refuse to run if it can't locate your mouse.

Troubleshooting Your Sound Blaster: The Official Book Disk Installation

Due to the nature of the programs contained on the *Sound Blaster: The Official Book* disk, you may encounter problems with your installation. Do not despair. The following is a list of helpful techniques and common problems and their solutions.

If your particular problem is not covered in the list below, reread the installation directions above to make sure that you did not miss any steps. It would also be a good idea to test that your Sound Blaster card works with other software, such as that received from Creative Labs, to ensure that your Sound Blaster card is installed correctly.



Caution Be aware that if you run INSTALL more than one time, it will modify your AUTOEXEC.BAT file more than once. If you have run INSTALL more than once, make sure that duplicate lines do not exist in your AUTOEXEC.BAT file. The following techniques will help in this situation.

Technique: How to Examine Your AUTOEXEC.BAT File

With the following command you can examine your AUTOEXEC.BAT file to see what changes were made to your PATH statement. Type the following command, followed by the **ENTER** key, to display your AUTOEXEC.BAT file on the screen:

```
TYPE C:\AUTOEXEC.BAT
```

If the AUTOEXEC.BAT is so long that it scrolls off the top of the screen before you can read it, try the following variation of the type command. Press **ENTER** to see the next screen:

```
TYPE C:\AUTOEXEC.BAT | MORE
```

Technique: How to Examine Your CONFIG.SYS File

With the following command you can examine your CONFIG.SYS file to see whether you have a SHELL= statement and to examine the FILES= and BUFFERS= statements. Type the following command, followed by the **ENTER** key, to display your CONFIG.SYS file on the screen:

```
TYPE C:\CONFIG.SYS
```

If the CONFIG.SYS is so long that it scrolls off the top of the screen before you can read it, try the following variation of the type command. Press **ENTER** to see the next screen:

```
TYPE C:\CONFIG.SYS | MORE
```

Technique: How to Restore Your Original CONFIG.SYS and AUTOEXEC.BAT Files

You can restore your original AUTOEXEC.BAT file by typing the following commands, in the order shown, at the DOS command prompt. The original version was saved as either AUTOEXEC.SAV (prior to changes by SETUP.BAT) or AUTOEXEC.DB (prior to changes made by INSTALL.EXE). Don't be concerned if you get the message "file not found" when you type the second command line—it means that the installation process didn't have to make a backup copy of your AUTOEXEC.BAT file at that stage. Press the **ENTER** key after you type each of these command lines:

```
COPY C:\AUTOEXEC.SAV C:\AUTOEXEC.BAT  
COPY C:\AUTOEXEC.DB C:\AUTOEXEC.BAT
```

The installation procedure also saves your CONFIG.SYS file. You can restore the original version by typing the following two command lines:

```
COPY C:\CONFIG.SAV C:\CONFIG.SYS  
COPY C:\CONFIG.DB C:\CONFIG.SYS
```

Common Problems and Solutions

Following is a list of common problems you may encounter. If you're having difficulty with installation or use of the software on the disk, this is the first place to look. Most likely you will find the solution to your problem here.

Problem: When I type SPUTOFF to unload SPUTMON I have no problem. But, when I type SPUTON to turn on SPUTMON, my system locks up.

Solution: You are probably encountering a dreaded TSR conflict. Try one of the following remedies:

1. SPUTMON is a TSR (Terminate and Stay Resident) program. When loaded, it runs unseen, in the background. Like all TSRs, SPUTMON may interfere with other programs, such as network drivers. If you are connected to a network and are encountering problems running SPUTMON, create a boot disk for connecting to the network without SPUTMON. On the boot disk, use the original AUTOEXEC.BAT and CONFIG.SYS files, the ones you had before installing the disk that accompanies this book. Make certain to check that command lines in the AUTOEXEC.BAT and CONFIG.SYS files that reference files on the hard disk are preceded by the drive letter for the hard disk. For example, the command line C:\WINDOWS\HIMEM.SYS will always work correctly but \WINDOWS\HIMEM.SYS won't locate the windows directory if you boot from a floppy.
2. If, when running SETUP, you answered yes to the question "Do you want SPUTMON to load automatically....," your AUTOEXEC.BAT will contain the following lines, which load SPUTMON automatically when you power up:

```
CALL C:\SBDISK\SBENV.BAT /q
CALL C:\SBDISK\SPUTON.BAT
```

Try "remarking" these lines out of your AUTOEXEC.BAT to see if your problems disappear. Do this by typing the abbreviation REM before each line, followed by a space, as follows:

```
REM C:\SBDISK\SBENV.BAT /q
REM C:\SBDISK\SPUTON.BAT
```

Remarking these lines out of your AUTOEXEC.BAT will make them inactive. SPUTMON will not be loaded automatically when you boot up. Reboot to have these changes take effect.

Problem: When you try to run SBSTATUS, BMASTER, SPUTON, SPUTOFF, or SS from any directory other than \SBDISK, you encounter one of the following:

- ☐ You see a "bad command or file name" message
- ☐ Odd things happen to your machine

- ☐ Your machine crashes.

Solution: If your AUTOEXEC.BAT has a PATH statement, make sure that the path listed below was added to your PATH statement:

C:\SBDISK

For example:

PATH=C:\;C:\DOS;C:\UTIL;C:\SBDISK



Note If the floppy disk contents were installed to a drive other than C:, that drive letter must appear in the PATH statement. For example, if, when running INSTALL, you selected your D: drive, your PATH should contain D:\SBDISK rather than C:\SBDISK.



Note If you do not have a PATH statement in your AUTOEXEC.BAT file, you must add one. Using an editor or word processing program designed for revising ASCII text files, add the line below to the beginning of your AUTOEXEC.BAT file:

PATH=C:\SBDISK

Problem: You receive one of the following error messages or a similar message:

- ☐ "Out of environment space"
- ☐ "Memory allocation error. Cannot load COMMAND, system halted"
- ☐ "Cannot load Command"
- ☐ An error from your memory manager, such as an exception error from QEMM.

Solution: Increase the size of your DOS environment. If your CONFIG.SYS file doesn't contain a SHELL statement, add one as follows. Using an editor or word processing program designed for revising ASCII text files, add the following line to your CONFIG.SYS file. You must have at least one space after "COM" and after "1024," and no other spaces within the command line:

SHELL=C:\COMMAND.COM /E:1024 /P



Note If COMMAND.COM exists on a different drive or directory, adjust the SHELL statement accordingly. It's often found in the \DOS directory.

If your CONFIG.SYS has a value of less than 1024, change it to 1024 as shown above. If your CONFIG.SYS already has a /E: value of 1024 or greater, increase the value by another 200 to 300 if the problem persists.

Problem: You want to return your computer to how it was before you ran INSTALL, so you can redo the installation, but you're not comfortable with the idea of editing CONFIG.SYS and AUTOEXEC.BAT files. Is there an easier way to do this?

Solution: Follow the instructions for the technique described above under the heading: "Technique: How to Restore Your Original CONFIG.SYS and AUTOEXEC.BAT Files." The installation process has probably created the directory \SBDISK on your hard drive even if you prematurely terminated the installation. As a result, when you rerun the INSTALL program, it will report that the installation disk files are already found on the hard disk. You will then be prompted for a Yes/No response on whether to overwrite these files. Answer Y to every question. This is less work than deleting all the files and subdirectories within \SBDISK prior to rerunning INSTALL.

Problem: Now that you've installed the disk, you have problems running your other programs. For example, SBTALKER only talks once and then goes silent, and the VEDIT2 screen has junk displayed. Some of your other programs don't seem to work right either.

Solution: Sputter Monitor can conflict with other programs. If you suspect this is the case, temporarily disable SPUTMON with the SPUTOFF command before running these other programs to prove whether SPUTMON is the source of the conflict. If necessary, you can permanently disable SPUTMON by editing the AUTOEXEC.BAT file. You can also add the PS (program suspend) command to SPUTMON.DEF (Sputter Monitor's configuration file) to cause SPUTMON to automatically disable itself when certain programs are run. This works, for example, for VEDIT2 but not for SBTALKER. See the section "Suspending SPUTMON's Operation" in Chapter 9, "Making Your System Come Alive with SPUTMON," for further information.