

Sound Blaster 16 PnP

User Guide

On-line Version

Getting Started

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ATTENTION: Ce carte est destiné à être installé par l'utilisateur, dans un ordinateur compatible certifié CSA/TUV/UL ou listé IBM AT, à l'intérieur de la zone définie par le fabricant. Consulter le mode d'emploi ou le fabricant de l'appareil pour vérifier ou confirmer si l'utilisateur peut y installer lui-même des cartes périphériques.

Notice for the USA

FCC Part 15: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, this notice is not a guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the distance between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

CAUTION: To comply with the limits for the Class B digital device, pursuant to Part 15 of the FCC Rules, this device must be installed in computer equipment certified to comply with the Class B limits.

All cables used to connect the computer and peripherals must be shielded and grounded. Operation with non-certified computers or non-shielded cables may result in interference to radio or television reception.

Modifications

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

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Cet appareil est conforme aux normes de CLASSE "B" d'interférence radio tel que spécifié par le Ministère Canadien des Communications dans les règlements d'interférence radio.

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This product conforms to the following Council Directive:

- Directive 89/336/EEC, 92/31/EEC (EMC)

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Introduction

Welcome to the next wave of multimedia computing!

Fully Adlib and Sound Blaster compatible, your audio card supports the following features:

- Plug and Play ISA Specification version 1.0a compliance
- Compression algorithms such as A-law, Mu-law, CTADPCM, and IMA-ADPCM

The *Getting Started* manual shows you how to install and get the most out of your audio card.

Before You Begin

Before starting on your audio card installation, read the following sections:

- Checking System Requirements
- Getting Latest Information
- Making a Copy of Your Diskettes
- Using This Guide
- Document Conventions

Checking System Requirements

The minimum system requirements for your audio card are:

- An 80386 computer with an EGA or VGA card installed (VGA recommended)
- 7.5 MB of hard disk space for your audio card's software
- 4 MB RAM
- Windows 95 or Windows 3.x with DOS 5.0 and a Plug and Play configuration manager

Getting Latest Information

Your audio card may include diskettes or a CD-ROM for installing software. The README file, on the first diskette or the CD-ROM, contains the latest information and changes.

To view the file in Windows 95 using the first installation diskette:

1. Start Windows 95.
2. Insert the diskette into your floppy drive.
3. Open the My Computer window by double-clicking its icon.
4. Double-click the icon representing the drive containing your diskette. The README file appears in the folder.
5. Double-click the README file. The Windows 95 Notepad appears, displaying the text of the README file.

To view the file in Windows 95 using the installation CD-ROM:

1. Start Windows 95.
2. Insert the CD-ROM into your CD-ROM drive. If Windows 95 automatically plays the CD-ROM, a dialog prompting you to install the software or to exit the setup appears. Choose Exit.
3. Open the My Computer window by double-clicking its icon.
4. Right-click on the CD-ROM drive icon. A menu appears, listing the various options available to the drive.
5. Select Readme. The Windows 95 Notepad appears, displaying the text of the README file.

To view the file in DOS:

1. Start your computer.
2. If your audio card includes installation diskettes, insert the first diskette into the floppy drive. If the audio card includes an installation CD-ROM, insert the disc into your CD-ROM drive.
3. Change to the drive containing the file. Normally, this is drive A or B for an installation diskette and drive D for a CD-ROM. (For example, Type **A:** and press ENTER to change to drive A.)
4. Type **README** and press ENTER. The contents of the README file are displayed.



If you want to read the file in Windows 3.x, you can do so by going to the Windows DOS box and following steps 2 to 4.

Making a Copy of Your Diskettes

If you have not made a copy of the diskettes included with your audio card, do so before installing the software. Store the original diskettes in a safe place.

Using This Guide

This guide provides information on how to install your audio card. It is arranged as follows:

Chapter 1, “Knowing Your Audio Card,” contains information about the hardware components on your audio card. The possible settings, software-configurable, are also listed. If you are new to audio cards, read this chapter before you set up your card.

Chapter 2, “Setting Up Your Audio Card,” guides you through the process of installing the card in your system and connecting external devices such as speakers.

Chapter 3, “Installing Software in Windows 95,” this chapter helps you install the software in Windows 95.

Chapter 4, “Installing Software in DOS/Windows 3.x,” this chapter shows you how to install the software in DOS/Windows 3.x.

Chapter 5, “Changing Your Audio Card Settings,” shows you how to change the hardware settings on your audio card.

Appendix A, “General Specifications,” describes the general specifications of your audio card.

Appendix B, “Hardware Information,” provides information on the connectors on your audio card, as well as how to redirect sounds from your PC speaker to external speakers connected to your audio card.

Appendix C, “Troubleshooting,” provides tips and strategies for solving the problems you may encounter with your audio card.

Document Conventions

This manual follows certain conventions to help you locate and identify the information that you need:

- Text Conventions
- Icons

In this manual, Sound Directory or path refers to the directory in which your audio card's software is stored (for example, SB16).



Text Conventions

The following text conventions are used to help you distinguish elements of the text.

Text Element	Use
bold	Command names, switches, and any text that must be entered exactly as it appears.
<i>italic</i>	At the DOS command line, represents information you must provide. The parameters and options are usually described following the command. Also, title of a book or manual.
UPPERCASE	Key, directory name, file name, or acronym.

Icons

In this manual, icons are used to highlight areas of text that require your extra attention.

Icon	Use
	A tip or some useful information.
	A warning.

Knowing Your Audio Card

This chapter locates and identifies the components of your audio card, and provides information on the software-configurable settings:

- Jacks
- Connectors
- Jumpers
- Software-Configurable Settings



Place the audio card in front of you as you read this chapter. This will help you identify the components being described.

Jacks

Jacks are one-hole connecting interfaces on your audio card that allow you to attach other devices. Jacks are found on the rear panel of your audio card (Figure 1-1).

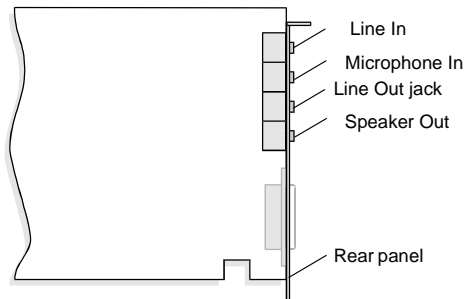


Figure 1-1: Jacks on your audio card.

Line In Jack

The line in jack allows you to connect devices such as a cassette or minidisc player to your audio card for playback or recording.

Microphone In Jack

The microphone in jack allows you to connect an external microphone for voice input.

Line Out Jack

The line out jack allows you to bypass your card's internal amplifier to connect powered speakers or an external amplifier for audio output.

Speaker Out Jack



Your audio card may not have a speaker out jack.

The speaker out jack allows you to connect speakers for audio output from the built-in amplifier. The built-in amplifier has a maximum output of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power.

Connectors

Connectors are interfaces on your audio card that allow you to attach other devices. Connectors consist of pairs of pins (Figure 1-2).

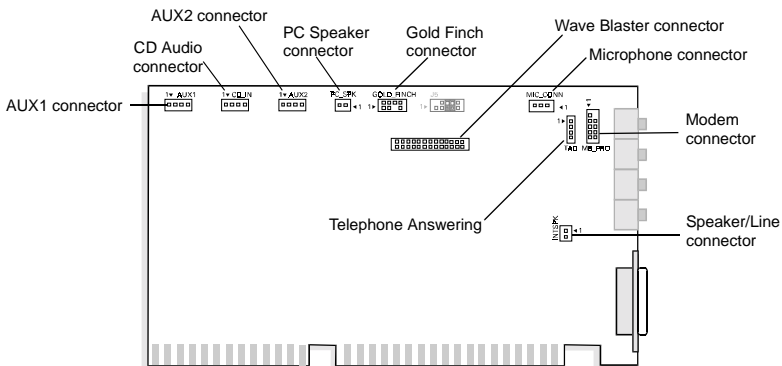


Figure 1-2: Connectors on your audio card.



Not all the connectors shown in Figure 1-2 may be available on your audio card.

The connectors found on your audio card include:

- AUX1 and AUX2 Connectors
- CD Audio Connector
- Joystick/MIDI Connector
- Microphone Connector
- Modem Connector
- PC Speaker Connector
- Speaker/Line Connector
- Telephone Answering Device Connector
- Gold Finch Connector
- Wave Blaster Connector

AUX1 and AUX2 Connectors



Your audio card may not have the AUX1 connector.

The AUX1 and AUX2 connectors allow you to connect internal audio sources, such as TV Tuner or MPEG, to your audio card. The volume of devices connected to AUX1 and AUX2 are controlled by the CD and line in volume sliders, respectively, in the Mixer. Refer to “AUX1 Connector Pin Assignments” and “AUX2 Connector Pin Assignments” on page B-2 for details on each pin of the connectors.

For information on the Mixer, refer to the *User's Guide* of your audio card.

CD Audio Connector

The CD audio connector allows you to connect the CD audio cable from your audio card to a CD-ROM drive. With an audio cable connecting the CD-ROM drive and the audio card, you can play CD music through speakers attached to the audio card. Refer to “CD Audio Connector Pin Assignments” on page B-2 for detailed information about each pin of the connector.

Joystick/MIDI Connector

The joystick/MIDI connector allows you to connect a joystick or a MIDI device to your audio card.

You can purchase an optional MIDI kit that contains a MIDI adapter with a joystick connector that allows you to plug in a joystick and a MIDI device simultaneously.

Microphone Connector

The microphone connector allows you to connect your internal condenser microphone to your audio card. Refer to “Microphone Connector Pin Assignments” on page B-3 for details on each pin.

Modem Connector

The modem connector allows you to connect your audio card to any modem card that is designed for this interface. Refer to “Modem Connector Pin Assignments” on page B-3 for details on each pin.

If you are using this connector, refer to your modem card’s documentation for further instructions.

PC Speaker Connector

The PC Speaker connector allows you to redirect sounds that normally come from the PC speakers to your external speakers. Please refer to “PC Speaker Connector Pin Assignments” on page B-3 for detailed information about each pin of the connector.

Speaker/Line Connector



Your audio card may not have the speaker/line connector.

The speaker/line connector allows you to connect your audio card to the built-in speakers in your computer. Refer to “Speaker/Line Connector Pin Assignments” on page B-4 for details on each pin of the connector.

Telephone Answering Device Connector



Your audio card may not have the telephone answering device connector.

The telephone answering device connector provides a monaural connection from a standard voice modem to your audio card. It also transmits microphone signals from your card to the modem. Refer to “Telephone Answering Device Connector Pin Assignments” on page B-4 for details on each pin of the connector.

Gold Finch Connector

The Gold Finch connector allows you to connect your audio card to a synthesizer card, such as the AWE upgrade card. This option leaves the line-in jack free for other uses. An AWE upgrade card will allow you to enjoy realistic acoustic reproduction through digitized sound samples. For more information regarding the use of this connector, refer to your AWE upgrade card installation guide.

Refer to “Gold Finch Connector Pin Assignments” on page B-4 for detailed information about each pin of the connector.

Wave Blaster Connector

The Wave Blaster connector allows you to connect a Wave Blaster daughterboard to your audio card. For more information regarding the connection and use of this card, refer to the Wave Blaster installation guide.

Refer to “Wave Blaster Connector Pin Assignments” on page B-5 for details on each pin of the connector.

Jumpers

Jumpers are sets of pins that you can use to define the hardware settings of your audio card (Figure 1-3).

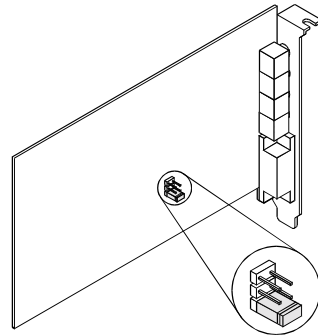


Figure 1-3: Jumpers.

A jumper can be *enabled* or *disabled*. A jumper is *enabled* when a cap or block, is placed over the jumper's two pins (Figure 1-4).

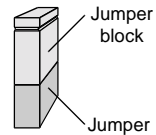


Figure 1-4: Enabled jumper.

In contrast, a *disabled* jumper has no jumper block or a jumper block over one pin as shown in Figure 1-5.

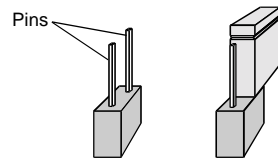


Figure 1-5: Two types of disabled jumpers.

Knowing Hardware Settings

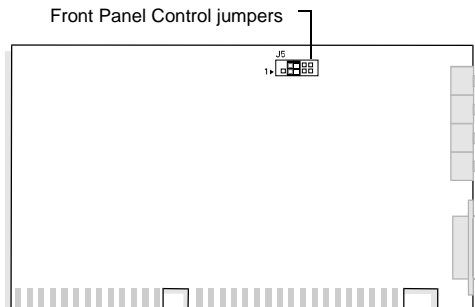


Your audio card may not have the jumpers described below.

The jumpers on your audio card are shown in Figure 1-6.

Figure 1-6: Jumpers on your audio card.

The two jumpers on J5 must not be removed. If the default settings are changed from their default settings (Figure 1-6), no sound is output from the audio card.



Software-Configurable Settings

This section describes the software-configurable settings that are set by your Plug and Play system:

- I/O Addresses
 - Base I/O Address of Audio Interface
 - Base I/O Address of Game/Joystick Interface
 - Base I/O Address of Stereo Music Synthesizer
 - Base I/O Address of MPU-401 UART
- Interrupt Request (IRQ) Lines
 - The default IRQ Line of Audio Interface
- Direct Memory Access (DMA) Channels

Your audio card supports Plug and Play: A Plug and Play system assigns resources automatically, such as I/O addresses and IRQ lines required by your audio card.

I/O Addresses

I/O addresses (or I/O address range) are areas of memory used by your computer's central processor to distinguish among various peripheral devices connected to your system when sending or receiving data. The devices on your audio card are listed in the table below with an example of Plug and Play assigned I/O address ranges.



The base I/O address is the starting address of each I/O address range.

I/O Address Range	Usage
220H to 233H (default)	Audio interface
200H to 207H	Game/Joystick interface
388H to 38BH	Stereo music synthesizer
300H to 301H	MPU-401 UART

Interrupt Request (IRQ) Lines

The IRQ line is the signal line your device uses to notify your computer's central processor that it wants to send or receive data for processing.

The table below lists an example of an IRQ line that may be assigned to the audio interface on your audio card.

IRQ Line	Usage
5	Audio interface

Direct Memory Access (DMA) Channels

The DMA channel is the data channel your device uses to transfer data directly to the system's memory.

The audio interface transfers data through the Low and High DMA channels. The table below shows a possible combination of DMA channels that may be assigned to the audio interface.

DMA Channel	Usage
1	Audio interface's Low DMA channel
5	Audio interface's High DMA channel

Setting Up Your Audio Card

Installing your audio card involves three steps: inserting the card into the system, connecting devices to the card, and installing the card's software. This chapter guides you through the first two steps:

- ❑ Installing the Card
- ❑ Connecting Other Devices

Chapters 3 and 4 describe the process of installing the card's software in Windows 95 and Windows 3.x.



If you are installing your audio card in a system that is running DOS or Windows 3.x, you need to install a Plug and Play (PnP) configuration manager before you proceed with the installation. The PnP configuration manager allows you to install your PnP audio card with a non-PnP operating system.

Installing the Card

To install the card:

1. Switch off your system and all peripheral devices. Unplug the power cord from the wall outlet.



The power cord and wall outlet shown may be different from that shown.

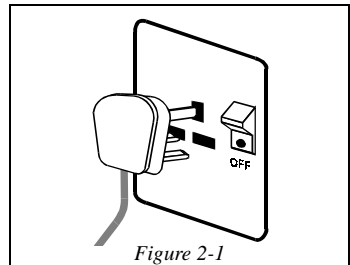


Figure 2-1

2. Touch a metal plate on your system to ground yourself and discharge any static electricity.

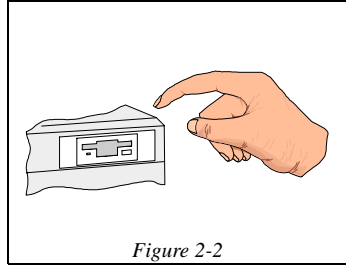


Figure 2-2

3. Remove the cover from your system.

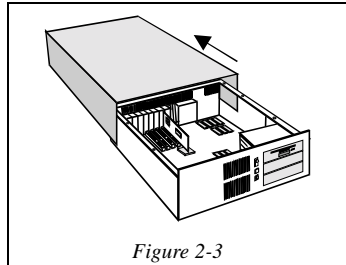


Figure 2-3

4. Find a free 16-bit expansion slot in your system.

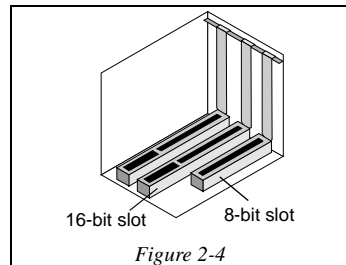


Figure 2-4

5. Remove the metal plate from the slot you have chosen and put the screw aside.

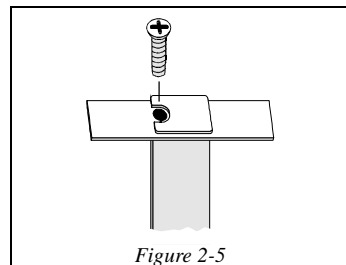


Figure 2-5

6. Align your card's 16-bit slot connector with the expansion slot and gently lower the card into the free slot as shown.

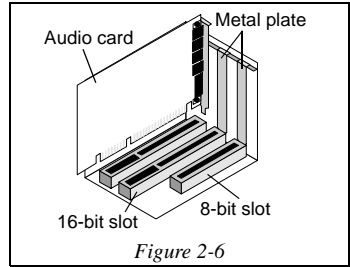


Figure 2-6

7. Secure the card to the expansion slot with the screw you removed from the metal plate.



If you are installing a CD-ROM drive, you need to install the drive now. For more information, refer to your CD-ROM drive documentation. Also, connect other peripheral cards, such as the Modem Blaster or AWE upgrade card to your audio card.

8. Replace the cover of your system.

Connecting Other Devices

Once the audio card has been installed in your system, connect the speakers to your audio card's speaker out jack. Figure 2-7 shows how to connect various devices to your audio card such as a microphone and a joystick. If you want to bypass the internal amplifier, connect powered speakers or an external amplifier to the line out jack.

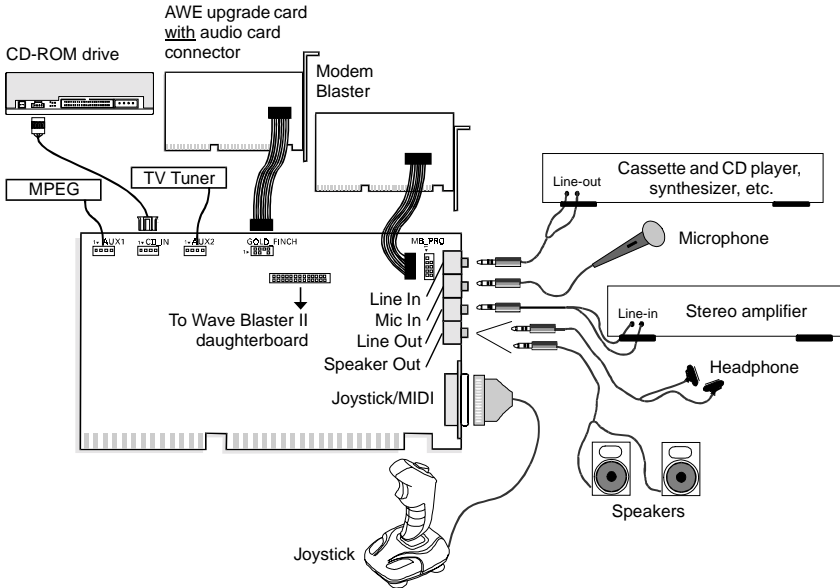


Figure 2-7: Connecting external speakers and other devices.

The joystick connector on your audio card is identical to that of a standard PC game control adapter or game I/O connector. You can connect any analog joystick with a 15-pin D-shell connector. It also works well with any application that is compatible with the standard PC joystick. To use two joysticks, you need a Y-cable splitter.

Installing Software in Windows 95

After you install the audio card, you can install the software. This chapter describes the installation of the software in Windows 95:

- Setting Up Audio Card Drivers
- Installing Your Audio Card's Applications
- Testing the Installation
- Uninstalling Your Audio Card's Applications



You must have Windows 95 properly installed. Otherwise, you cannot successfully complete the installation process in this chapter. Also, if your audio card includes an installation CD-ROM, your CD-ROM drive must be properly installed.

Setting Up Audio Card Drivers



Go to “Installing Your Audio Card's Applications” if you have a CD-ROM installed or if your audio card's drivers are set up.

After you install the audio card and restart your system, Windows 95 begins setting up the drivers. Windows 95 detects the the audio card and its components, and either automatically installs the drivers or prompts you for the drivers. To set up the drivers for your audio card, you need your Windows 95 installation diskettes or CD-ROM.

The following prompts and message may appear on the screen during the setup process. They may not appear in the sequence shown below.

- If a message such as Figure 3-1 appears, take note and wait for the next message or dialog.

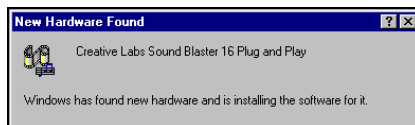


Figure 3-1: Message announcing the detection of a device.

- ❑ If a dialog (Figure 3-2) appears, choose OK. If you are prompted for a Windows 95 installation diskette, insert the indicated diskette into a drive and choose OK.

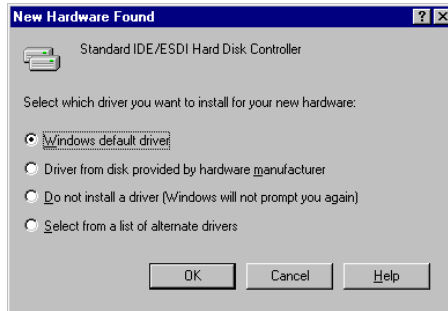


Figure 3-2: Driver installation dialog with Windows default driver option enabled.

- ❑ If a dialog (Figure 3-3) appears:



Figure 3-3: Driver installation dialog with Windows default driver option disabled.

1. Choose OK. An Install From Disk dialog (Figure 3-4) appears.

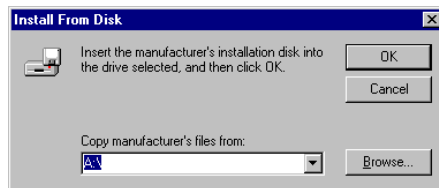


Figure 3-4: Install From Disk dialog.

2. Insert the audio card's Drivers Disk into your floppy drive.
3. Click the list and select the letter of the disk drive.
4. Choose OK. The required files are copied from the diskette to your hard disk.


Installing Your Audio Card's Applications

Your audio card's applications can be installed from diskettes or a CD-ROM depending on which is supplied in your package.

To install from CD-ROM:

1. Load your audio card's software installation CD-ROM into your CD-ROM drive. The CD-ROM supports Windows 95 AutoPlay mode and starts running automatically. If it does not, refer to Appendix C, "Troubleshooting."
2. Follow the instructions on the screen to finish installing your audio card's applications.

To install the applications from diskettes:

1. Insert the applications' first installation diskette into the appropriate drive in your system.
2. Click  on the taskbar. The Start menu appears.
3. Select Settings from the Start menu (Figure 3-5).

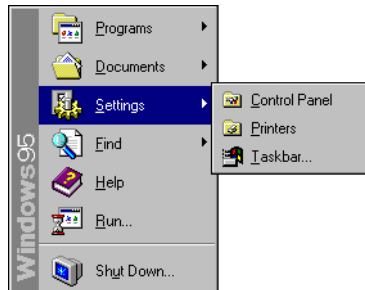


Figure 3-5: Settings submenu of the Start menu.

4. Select Control Panel from the Settings submenu. The Control Panel window (Figure 3-6) appears.

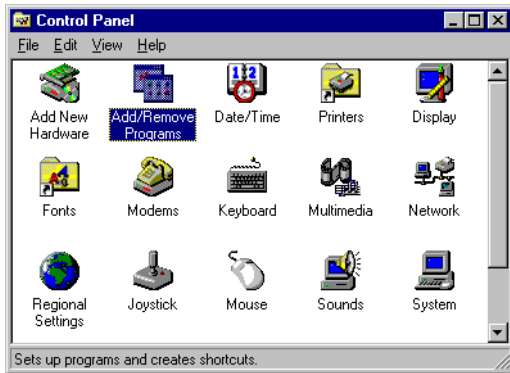


Figure 3-6: Control Panel window.

5. Double-click the Add/Remove Programs icon. The Add/Remove Programs Properties sheet (Figure 3-7) appears.

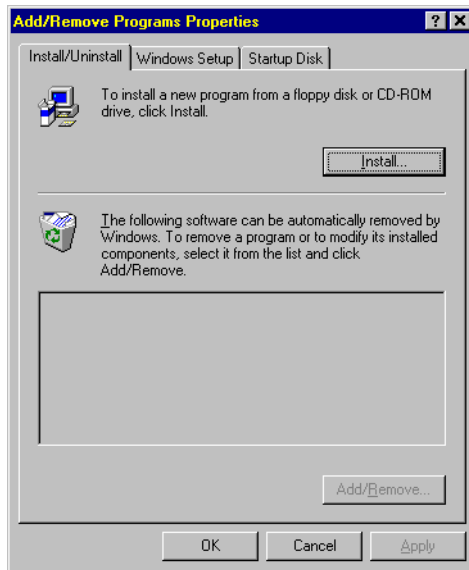


Figure 3-7: Add/Remove Programs Properties page.

6. Choose Install. The Install Program From Floppy Disk or CD-ROM dialog (Figure 3-8) appears.

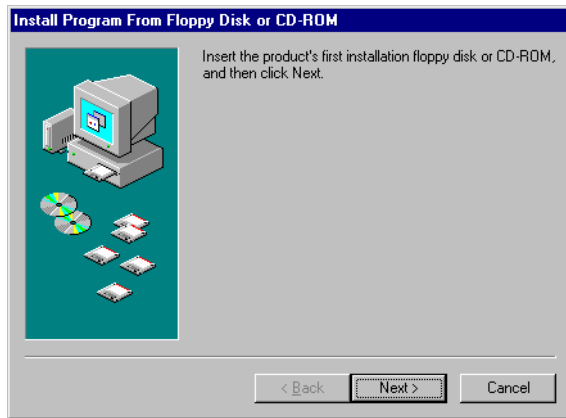


Figure 3-8: Install Programs from Floppy Disk or CD-ROM dialog.

7. Insert the installation diskette into your floppy disk drive.
8. Choose Next. The Run Installation Program dialog (Figure 3-9) appears and Windows 95 searches for the installation program.

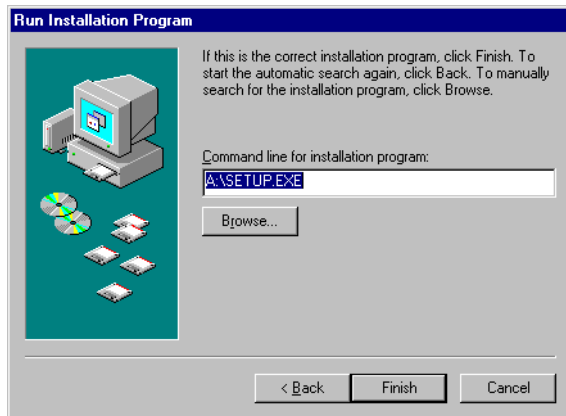


Figure 3-9: Run Installation Program dialog.


9. Once you have confirmed the location of the setup file, choose Finish. Follow the instructions on the screen to finish the installation.

Testing the Installation

When the applications have been installed, you can test your audio card to find out if it is working properly.

The testing procedure requires the Windows 95 Media Player. Follow the Start button's menus, as shown in Figure 3-12 on page 3-7, to see if the Media Player icon is displayed. If it is not displayed, follow the instructions below to install the Media Player. If it is displayed, go to the instructions on page 3-10 to test the audio card.

To install the Media Player:

1. Click  on the taskbar. The Start menu appears.
2. Select Settings and then Control Panel.
The Control Panel window is displayed.
3. Double-click the Add/Remove Programs icon. The Add/Remove Programs Properties sheet (Figure 3-7 on page 3-4) appears.
4. Click the Windows Setup tab. The Windows Setup tab page (Figure 3-10) appears.

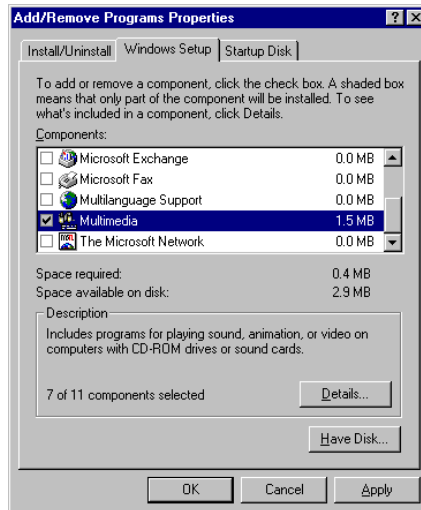


Figure 3-10: Windows Setup tab page in the Add/Remove Programs Properties paget.

5. Select Multimedia and choose Details. The Multimedia dialog (Figure 3-11) appears.

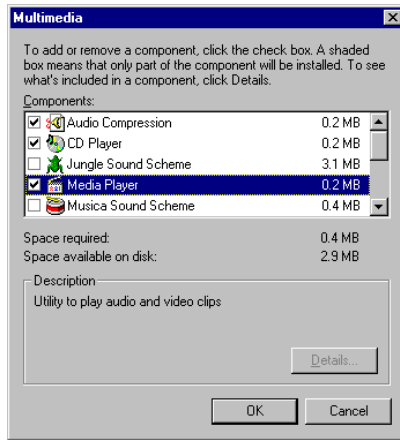


Figure 3-11: Multimedia dialog.

6. Click the Media Player check box and choose OK.
7. Follow the instructions on the Media Player installation. The Media Player is now installed.

To test the audio card:

1. Click **Start** on the taskbar. The Start menu appears.
2. Select Programs, Accessories, Multimedia, and Media Player (Figure 3-12).

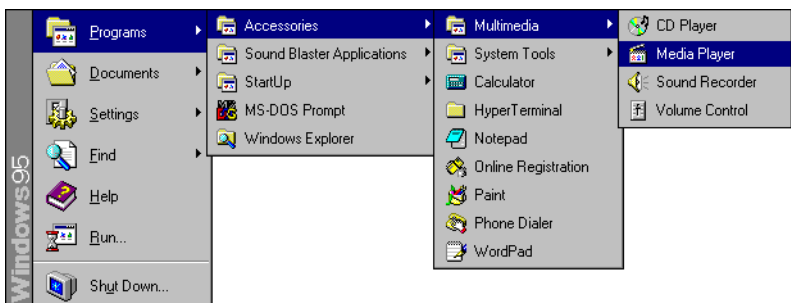


Figure 3-12: To activate the Media Player.

The Media Player appears (Figure 3-13).

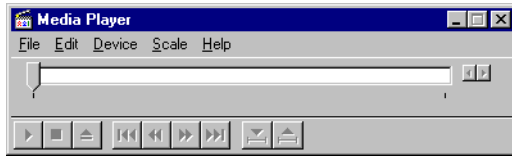


Figure 3-13: Media Player interface.


3. On the File menu, select the Open command. The Open dialog appears with a list of sounds (Figure 3-14).



Figure 3-14: Open dialog.



Your list of sounds may differ from the one shown in Figure 3-14.

4. Select a sound from the list.
5. Choose Open.
6. Click  on the Media Player. The sound is played.

If there is no sound during the test, check the following:

- Speakers are connected to the card's speaker out jack or speaker/line connector.
- Volume control of the speakers (if any) is set to mid-range.
- External amplifier or powered speakers connected to the card's line out jack (if you are not using the card's amplifier).
- Hardware conflict between the audio card and another device.



The built-in stereo power amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power.

Uninstalling Your Audio Card's Applications

Many applications share resources and make modifications throughout your system. The Windows 95 Uninstall feature allows you to remove applications cleanly or re-install them to correct problems, change configurations, or make version upgrades. You can use the Uninstall feature on your audio card's applications.



Close all audio card applications before running Uninstall. If an audio card application is running, the application is not removed.

To uninstall the applications:

1. Click on the taskbar. The Start menu appears.
2. Select Settings from the Start menu (Figure 3-15).

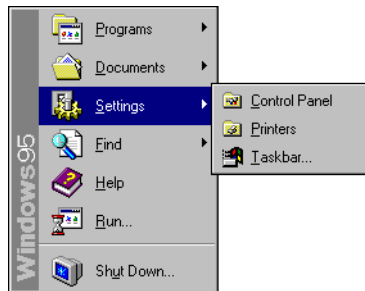


Figure 3-15: Settings submenu of the Start menu.

3. Select Control Panel from the Settings submenu. The Control Panel window (Figure 3-16) appears.

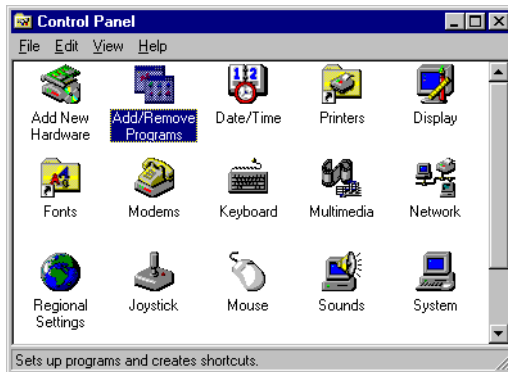


Figure 3-16: Control Panel window.

4. Double-click the Add/Remove Programs icon. The Add/Remove Programs Properties page (Figure 3-17) appears.

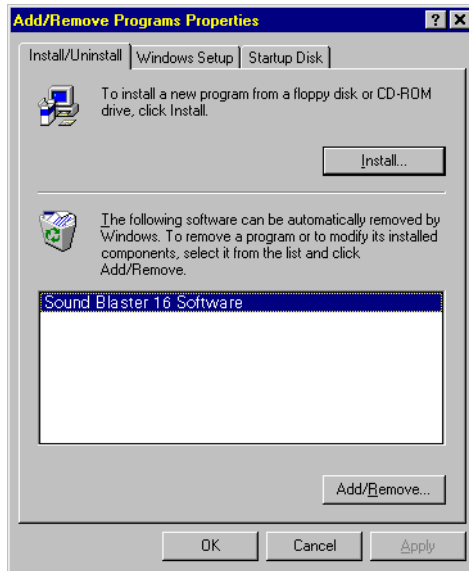


Figure 3-17: Add/Remove Programs Properties page.

5. Select Sound Blaster 16 Software from the list and choose Add/Remove. The files pertaining to your audio card's applications are deleted.
6. Follow the instructions on the screen to complete the uninstall.

Installing Software in DOS/Windows 3.x



Use the Plug and Play configuration manager to allocate resources to your audio card. The Plug and Play configuration manager must be installed before you proceed.


This chapter provides instructions for installing your audio card's software in DOS/Windows 3.x:

- Installing from Diskettes
- Installing from CD-ROM
- Testing the Installation
- Optimizing Memory Usage

Your audio card may include installation diskettes or an installation CD-ROM for your audio card's software. Read the appropriate section for installing from diskettes or CD-ROM.

Installing from Diskettes

To install the audio card's software from diskettes:

1. Start your system.
2. If you are in Windows, exit from Windows to DOS.
 -  The installation does not work if you install from the Windows DOS prompt.
3. Insert your audio card's first installation diskette into a drive.
4. At the DOS prompt, change to the disk drive. For example, if your diskette is in drive A, type **A:** and press ENTER.
5. Type **INSTALL** and press ENTER.
6. Follow the instructions on-screen to complete the installation.

When you complete the installation and reboot, proceed to the section "Testing the Installation" on page 4-3 to test the installation.

Installing from CD-ROM

Before you install the audio card's software from the CD-ROM, your CD-ROM drive must be working properly.



If you have not yet installed a CD-ROM drive and the associated drivers, refer to your CD-ROM drive's documentation for instructions. You can use the diskette provided with the CD-ROM to install the drivers needed by your CD-ROM drive.

To install the audio card's software from CD-ROM:

1. Start your system.
2. If you are in Windows, exit from Windows to DOS.



The installation does not work if you install from the Windows DOS prompt.

3. Insert the installation CD-ROM into your CD-ROM drive.
4. At the DOS prompt, change to the drive containing your CD-ROM. For example, type **D:** and press ENTER.
5. Change to the Windows 3.x directory of the CD-ROM by typing **CD WIN31** and pressing ENTER.
6. Type **INSTALL** and press ENTER.
7. Follow the instructions presented on the screen to complete the installation.

When you have completed the installation and rebooted, proceed to "Testing the Installation" to find out if your installation works.

Testing the Installation

Once you have installed the software, run the test program **DIAGNOSE** to make sure the card has been installed properly. This program checks the base I/O address, IRQ line, and DMA channels used by the audio interface. It then displays a menu to let you test the card's sound and music output.

To run the test program:

1. At the DOS prompt, change to the directory containing your audio card's software. For example, if your directory path is C:\SB16, type **C:\SB16** and press ENTER. The directory path may also be C:\VIBRA16.
2. Type **DIAGNOSE** and press ENTER.
3. Follow the instructions on the screen to complete the test.

If the test program stops or displays an error message when it is checking the audio interface's settings, it may be due to a conflict between the audio interface and another peripheral device. To resolve the conflict, you have to change the settings of your audio interface. See the section "Changing Settings in DOS/Windows 3.x" on page 5-1 or Appendix C, Troubleshooting on how to change the settings and resolve the conflicts.

If there is no sound output during the test, check the following:

- Speakers are connected to the card's Speaker Out jack or Speaker/Line connector.
- Volume control knob of the speakers (if any) is set at mid-range.
- External amplifier or powered speakers is/are connected to the card's Line Out jack if you decide not to use the card's internal power amplifier.
- No hardware conflict between the audio card and another peripheral device.



The built-in stereo power amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power.

Understanding the Installation Program

The installation program creates a directory and copies the software into it. You can then set up your Windows applications by adding a command to the WIN.INI file to run WINSETUP.EXE. This command automatically creates the audio card program group and the application icons when you next run Windows.



You can also choose to set up your Windows applications at a later time by running INSTALL from the audio card's directory in your hard disk. INSTALL also allows you to selectively set up components that were not installed previously.

The installation program also modifies your AUTOEXEC.BAT and CONFIG.SYS files.

AUTOEXEC.BAT File Settings

The installation program adds the following statements to the AUTOEXEC.BAT file:

```
SET BLASTER=A220 I5 D1 H5 P330 T6
SET SOUND=C:\SB16
SET MIDI=SYNTH:1 MAP:E
C:\SB16\DIAGNOSE /S /W=C:\WINDOWS
C:\SB16\MIXERSET /P /Q
```



The directory name SB16 may be VIBRA16 in your installation.

The first three statements set up the environment variables for your audio card. The last 2 statements run the DIAGNOSE and MIXERSET utilities.

The BLASTER statement is added by the DIAGNOSE utility, and the values shown above may differ from those in your system. Running DIAGNOSE with the /S parameter updates the BLASTER environment with the resource settings from the Plug and Play configuration manager. Running DIAGNOSE with the /W=C:\WINDOWS parameter updates the SYSTEM.INI file in the Windows directory with the resource settings from the Plug and Play configuration manager.



Refer to “Changing Settings in DOS/Windows 3.x” on page 5-1 for a description of the SOUND, BLASTER, and MIDI environment settings.

CONFIG.SYS File Settings

The installation program also adds the following statements to the CONFIG.SYS file if you choose to install the low-level DOS device drivers under custom installation:

```
DEVICE=C:\SB16\DRV\CTSB16.SYS /UNIT=0  
/BLASTER=A:220 I:5 D:1 H:5  
DEVICE=C:\SB16\DRV\CTMMSYS.SYS
```



The directory name SB16 may be VIBRA16 and the driver name CTSB16.SYS may be VIBRA16.SYS in your installation.

CTSB16.SYS (or VIBRA16.SYS) and CTMMSYS.SYS are low-level device drivers that provide wave playback and recording for DOS applications. These applications include third-party DOS applications developed with Creative Labs' Sound Blaster Developer Kit. The applications work with the drivers (such as CTWDSK.DRV, CTWMEM.DRV, CTVDSK.DRV, and CT-VOICE.DRV) that require the low-level drivers. The drivers are found in the DRV subdirectory of your audio card's directory.



Refer to “Optimizing Memory Usage” for more information.

If your system does not have enough memory when you are using Windows applications or playing DOS games, you can delete the above two statements from the CONFIG.SYS file using a text editor.

At a later time, you may discover that you need the low-level device drivers for your software application. You can load them into memory by typing **DIAGNOSE /A** at the DOS prompt and pressing ENTER. This command adds the required statements to the CONFIG.SYS file.

Optimizing Memory Usage

Before you start loading CTSB16.SYS (or VIBRA16.SYS) and CTMMSYS.SYS into memory, consider whether you actually need these drivers to run your software. If you do, load them into high memory (for example, using memory managers) to maximize your memory usage.

If you do not need these drivers (for example., if you are running Windows applications or playing DOS games only), you can bypass the loading of these drivers.

Using Memory Managers

You can use one of the following memory managers:

- ❑ If you use Microsoft DOS 6.x, run MEMMAKER to optimize the memory. (Please refer to the DOS 6.x documentation for instructions on how to use the MEMMAKER.)
- ❑ If you have a memory manager like QEMM or 386MAX, please refer to the respective software's documentation for instructions on how to optimize the memory.

Bypassing the Loading of the Low-Level Drivers

You may bypass the loading of the low-level device drivers in one of the following ways:

- ❑ Using the DOS 6.x's multiple boot sessions. With this feature, several sessions can be made available for selection during bootup. One session can contain settings that load the drivers into memory. When you do not wish to load these drivers into memory, you can select another session that allows you to boot up the system without these drivers. (Refer to your DOS 6.x documentation for instructions on how to create the multiple boot sessions.)
- ❑ Using the Bypass Installation feature of the low-level device drivers. During system startup, simply press and hold down the ALT key when the message "Starting MS-DOS..." appears.

Changing Your Audio Card Settings

This chapter shows you how to change the settings of the jumpers and resources in DOS/Windows 3.x.

Changing Settings in DOS/Windows 3.x

When your audio card encounters a conflict with another peripheral device, you need to change the resource settings of your audio card. This can be done by running the configuration utility that comes with your system's Plug and Play configuration manager.

The configuration utility shows you which resources are available for your audio card and allows you to choose them.

When you change the resource settings, you are prompted to reboot your system. During reboot, your system's environment is updated with the new settings. You can view the system's environment by typing **SET** at the DOS prompt. The three environment variables that belong to your audio card are described in the following subsections.

SOUND Environment Variable

The **SOUND** environment variable specifies the directory location of your audio card's drivers and applications. The syntax for the **SOUND** environment variable is as follows:

SOUND=*path*

path is the drive and directory of your audio card's software (for example C:\SB16 or VIBRA16).



There is no space before and after the equal sign.

BLASTER Environment Variable

The BLASTER environment variable specifies the base I/O address, IRQ line, and DMA channel of your audio interface. The syntax for the BLASTER environment variable is:

```
BLASTER=A220 I5 D1 H5 P330 T6
```



The values shown may be different for your system; there is no space before and after the equal sign, but there must be at least one space between two parameters.

Parameter	Description
A xxx	Specifies the audio interface's base I/O address. xxx can be 220.
I x	Specifies the IRQ line used by the audio interface. x can be 5.
D x	Specifies the low DMA channel used by the audio interface. x can be 1.
H x	Specifies the high DMA channel used by the audio interface. x can be 5.
P xxx	Specifies the MPU-401 UART interface's base I/O address. xxx can be 330.
T x	Specifies the card type. x must be 6.

MIDI Environment Variable

The MIDI environment variable specifies the MIDI file format used and where the MIDI data is sent to. The MIDI data can be sent to the internal stereo music synthesizer or MIDI port.

The three MIDI file formats available are General, Extended , and Basic. The syntax for the MIDI environment variable is:

```
MIDI=SYNTH:x MAP:x
```

Parameter	Description
SYNTH: x	x can be 1 or 2. 1 (default) specifies the stereo music synthesizer. 2 specifies MIDI port.
MAP: x	x can be G, E, or B. G specifies General MIDI fformat. E (default setting) specifies Extended MIDI format. B specifies Basic MIDI format.



General Specifications

This appendix lists the general specifications of your audio card.

Plug and Play

- ISA specification version 1.0a compliant

Stereo Music Synthesizer

- 4-operator 11-voice or 2-operator 20-voice stereo music synthesizer
- Compatible with previous Sound Blaster and Adlib music synthesizer chips

Stereo Digitized Voice Channel

- 16-bit and 8-bit digitizing in stereo and mono modes
- Programmable sampling rate, 5 kHz to 44.1 kHz in linear steps
- High and Low DMA channels using a single interrupt
- Dynamic filtering for digital audio recording and playback



Although the minimum programmable sampling rate is 5 kHz, your audio card applications may limit the minimum sampling rate to 8 kHz

Built-in Digital/Analog Mixer

- Mixes sources from digitized voice and inputs from MIDI devices, CD audio, line in, microphone, and PC speaker
- Selectable input source or mixing of various audio sources for recording

Volume Control

- Software volume control of master volume, digitized voice and inputs from MIDI device, CD audio, line in, microphone, and PC speaker
- PC speaker at 8 levels in 6 dB steps
- All other sources at 8 levels in 2 dB steps
- Full software control of fade-in, fade-out, and panning

Built-in Stereo Power Amplifier

- Four watts per channel with four ohms stereo output
- Fixed Gain Amplifier for Microphone Level
- Internal or External Audio Output Amplifier



Your audio card may not have the Speaker Out jack.

MIDI Interface

- Built-in MIDI interface for connection to external MIDI devices

Modem Connector

- Built-in Modem Blaster interface for connection to internal modem

Telephone Answering Device Connector

- Interface to connect a standard voice modem to the audio card and transmit microphone signals from the card to the modem



Your audio card may not have the Telephone Answering Device connector.

Upgrade Options

- Wave Blaster daughterboard for professional-quality music
- AWE upgrade card for wavetable upgrade option

B

Hardware Information

You may want to connect your audio card to other devices in your system, for example, to a Creative CD-ROM drive or another audio card. Or, you may want to redirect the computer sounds to your external speakers.

This appendix provides information on the following:

- AUX1 Connector Pin Assignments
- AUX2 Connector Pin Assignments
- CD Audio Connector Pin Assignments
- Microphone Connector Pin Assignments
- Modem Connector Pin Assignments
- PC Speaker Connector Pin Assignments
- Speaker/Line Connector Pin Assignments
- Telephone Answering Device Connector Pin Assignments
- Gold Finch Connector Pin Assignments
- Wave Blaster Connector Pin Assignments
- Redirecting PC Sounds to External Speakers



This appendix is made available only for advanced users who know how to use the pin assignments. If you want to redirect sound, you should be familiar with your system's motherboard and should know the location of its internal speaker.



To locate the connectors on your audio card, see Figure 1-2 on page 1-2.

AUX1 Connector Pin Assignments

The AUX1 connector has the pin assignments shown below.


Pin	Signal	I/O
1	AUX1 Left Channel	In
2	Ground	--
3	Ground	--
4	AUX1 Right Channel	In

AUX2 Connector Pin Assignments

The AUX2 connector has the pin assignments shown below.

Pin	Signal	I/O
1	AUX2 Left Channel	In
2	Ground	--
3	Ground	--
4	AUX2 Right Channel	In

CD Audio Connector Pin Assignments

The CD audio connector  has the pin assignments shown below.

Pin	Signal	I/O
1	Ground	--
2	CD Left Channel	In
3	Ground	--
4	CD Right Channel	In

Microphone Connector Pin Assignments

The microphone connector has the pin assignments shown below.

Pin	Signal	I/O
1	Mic-In	In
2	Analog Ground	--
3	Mic Power	In

Modem Connector Pin Assignments

The Modem connector has the pin assignments shown below.

Pin	Description	I/O
1	Analog Ground	--
2	Pin is cut to provide keyed connection.	N/A
3	Mono line level input from modem to Line In jack.	In
4	Analog Ground	--
5	Left channel audio output to modem.	Out
6	Analog Ground	--
7	Right channel audio output to modem.	Out
8	Mono line level input from modem to PC Speaker.	In
9	Analog Ground	--
10	Microphone input from modem.	In

PC Speaker Connector Pin Assignments

The PC speaker connector has the pin assignments shown below.

Pin	Signal	I/O
1	+5V	In
2	PC Speaker Out	In

Speaker/Line Connector Pin Assignments

The speaker/line connector has the pin assignments shown below.

Pin	Description	Pin	Description
1	Left channel line level audio out	2	Right channel line level audio out
3	Analog Ground	4	Analog Ground
5	Left channel speaker audio out	6	Right channel speaker audio out

Telephone Answering Device Connector Pin Assignments

The telephone answering device connector has the pin assignments shown below.

Pin	Description	I/O
1	Mono Line-In from modem.	In
2	Analog Ground	--
3	Analog Ground	--
4	Mic-Out: Microphone output to modem.	Out

Gold Finch Connector Pin Assignments

The Gold Finch connector has the pin assignments shown below.

Pin	Description	Pin	Description
1	EMUR	5	KEYED
2	AGND	6	AGND
3	EMUL	7	AGND
4	AGND	8	AGND

Wave Blaster Connector Pin Assignments

The Wave Blaster connector has the pin assignments shown below.

Pin	Description	Pin	Description
1	Digital Ground	2	NC
3	Digital Ground	4	MIDI Output
5	Digital Ground	6	VCC
7	Digital Ground	8	MIDI Input
9	Digital Ground	10	VCC
11	Digital Ground	12	NC
13	NC	14	VCC
15	Analog Ground	16	NC
17	Analog Ground	18	+12 V
19	Analog Ground	20	Line In: Right
21	Analog Ground	22	-12 V
23	Analog Ground	24	Line In: Left
25	Analog Ground	26	ResetB

Redirecting PC Sounds to External Speakers

You can redirect the sounds that normally come from your computer's speaker to the speakers connected to the audio card.



If you do not know how to perform this process, seek the help of an experienced technician.


To redirect PC sounds to external speakers:

1. Locate the PC Speaker connection on the motherboard.
2. Remove this connection from the motherboard.
3. Connect a wire from the +5V DC pin on the motherboard speaker connector to pin 1 of the PC speaker connector on the audio card.
4. Connect another wire from the PC speaker out pin on the motherboard speaker connector to pin 2 of the PC speaker connector on the card.

Troubleshooting

This appendix provides some tips and strategies for solving some of the problems you might encounter with your audio card either during installation or normal use.

Installing Audio Card Software from CD-ROM

- PROBLEM** The CD-ROM does not automatically run after you insert it into the drive.
- Cause** The AutoPlay notification setting in your Windows 95 system may not be enabled.
- Solution** Try one of the following:
- Click the “Auto Insert Notification” check box. This check box can be found in your CD-ROM drive’s properties sheet. To display this sheet:
 1. Click  on the taskbar.
 2. Select Settings and then Control Panel.
 3. Double-click the System icon.
 4. Click the Device Manager tab and select your CD-ROM drive.
 5. Choose Properties. The properties sheet for your CD-ROM drive appears.
 - Alternatively, if you do not want to enable the “Auto Insert Notification” check box, perform the following steps:
 1. Double-click the My Computer icon on your Windows 95 desktop.
 2. Right-click the CD-ROM drive icon. A pop-up menu appears.
 3. Select AutoPlay on the menu.
 4. Follow the instructions that appear.

Sound

- PROBLEM** No output from both the 8-bit and 16-bit digitized sounds when running the test program.
- Causes**
1. Volume knob on your speakers is not set properly.
 2. Your speakers are connected to the wrong jack.
- Solutions**
1. Check that the volume knob or any other volume control found on the speaker is not set to zero.
 2. Make sure the speakers are connected to the Speaker Out jack on your audio card.

DOS

PROBLEM SOUND or BLASTER environment could not be found.

Cause The command to set up the SOUND or BLASTER environment might not be included in the AUTOEXEC.BAT file. The SOUND environment specifies the directory location of your audio card's software while the BLASTER environment specifies the base I/O address, IRQ line, and DMA channel settings of your audio interface. Both environment strings need to be set up in the DOS environment. When you install your audio card's software, the commands to set up the environments are automatically added to the AUTOEXEC.BAT file so that both environment strings are set up whenever your system is started or restarted. Whenever you make changes to the environment strings, it is advisable that the changes be reflected in the AUTOEXEC.BAT file.

Solution To add the command to set up the BLASTER environment in the respective system files, run DIAGNOSE (see the section "Changing Settings in DOS/Windows 3.x" on page 5-1). To set up the SOUND environment, use a text editor to insert the statement **SET SOUND=C:\SB16** into the AUTOEXEC.BAT file. Remember to reboot for the changes to take effect.



The directory name SB16 may be VIBRA16 in your installation.

PROBLEM	Error message “Out of environment space.”
Cause	The system environment space is used up.
Solution	Add the statement SHELL=C:\COMMAND.COM /E:512 /P to the CONFIG.SYS file. /E defines a new size for the system environment space. You can choose a higher value if the environment size is already 512 bytes. (Normally, the next value is 1024 bytes.) For more information on the above statement, refer to your DOS manual.
PROBLEM	System hangs during the 16-bit digitized sound test, but it works fine during the 8-bit test.
Cause	Your system’s motherboard cannot handle High DMA at full speed. On some machines, the DMA controller on the motherboard does not function properly during High DMA transfers. High DMA transfers on such machines might corrupt the data in main memory and cause the system to hang or encounter a parity error.
Solution	To solve this problem, run the Plug and Play configuration utility you have and select to use Low DMA in place of the High DMA channel. 16-bit PCM data will then be transferred through the Low DMA channel.

Windows 3.x

PROBLEM	No sound when running your audio card’s Windows applications.
Cause	One or more of the sound drivers might not be included in the SYSTEM.INI file.
Solution	Check the SYSTEM.INI file by following the steps below: <ol style="list-style-type: none"> 1. Choose Run from the File menu in Program Manager. 2. Type SYSEDIT in the Command Line text box and choose OK.

3. Make sure the following statements are present:

```
[boot]
drivers=mmsystem.dll msmixmgr.dll
[drivers]
timer=timer.drv
midimapper=midimap.drv
Aux=sb16aux.drv
Mixer=sb16aux.drv
Wave=sb16snd.drv
MIDI=sb16fm.drv
MIDI1=sb16snd.drv
[sndblst.drv]
Port=220
MIDIPort=330
Int=5
DmaChannel=1
HDmaChannel=5
```

The values shown in the **[sndblst.drv]** group may be different in your system.

If one or more of the statements are missing, run **INSTALL** in **DOS**. **INSTALL** rewrites **SYSTEM.INI** to set up the drivers. It also sets up the Windows applications.


Resolving Conflicts

Conflicts between your audio card and another peripheral device may occur if your card and the other device are set to use the same I/O address, IRQ line, or DMA channel.

Windows 95

To resolve conflicts in Windows 95, run Device Manager and change the resource settings of your audio card or the conflicting device.

To change the resource settings of your audio card:

1. Click  on the taskbar.
2. Select Settings and then Control Panel. The Control Panel window appears.
3. Double-click the System icon to display the System Properties page.
4. Click the Device Manager tab to display a list of devices.
5. Double-click Sound, video and game controllers. Your audio card's name appears.
6. Select your audio card and choose Properties. Your audio card's properties sheet appears.
7. Click the Resources tab.
8. Click the Use automatic settings check box. If this check box is already enabled, go to the properties page of the conflicting peripheral device and select the same check box.
9. Reboot your system to allow Windows 95 to reassign resources to your audio card and/or the conflicting peripheral device.



The Conflicting device list shows you the peripheral device that is in conflict with your audio card. The list is displayed on the Resources tab page of your audio card's properties page.

DOS/Windows 3.x

To resolve conflicts in DOS/Windows 3.x:

1. Run your Plug and Play configuration utility.
2. Reselect the resource settings of your audio card that are in conflict. For more details, refer to the documentation that comes with your Plug and Play configuration utility.