Trademark Acknowledgments:

- OPTI is a trademark of OPTI Incorporation.
- IBM is a trademark of International Business Machines Corporation.
- Sound Blaster PRO and Sound Blaster are trademarks of Creative Lab Inc.
- MS-DOS and WINDOWS are trademarks of Microsoft Corporation.

NOTE : LOADING SOFTWARE FROM YOUR CD-ROM DRIVE..

You will notice in the instructions concerning installation of software drivers contained in this manual, references to the CD-ROM drive letter **'d'** (i.e. **d:\eng\931\win95**) If this drive letter is not correct according to your system configuration, then please change as necessary.

1. Introduction

This Model # 23212 / 23262 **OPTI 931/OPTI 931+3D** Audio Controller is a 16-bit Full Duplex sound card based on the OPTi 82C931 Full Duplex Plug-n-Play Integrated Audio Controller Chip.

The **OPTI** Sound Card is available in two versions. The standard version **OPTI 931** is a 16-bit Full Duplex sound card whereas the **OPTI 931+3D** comes with a built-in '3D' features which is always enable. It adds hardware and software 3D sound effect to any audio signal, whether it is from an audio CD, MIDI or Wave file.

The *OPTI 931/OPTI 931+3D* Sound Card will let you run thousands of Sound Blaster and Sound Blaster PRO compatible games and applications, including a rapidly growing number of Windows business applications that are compatible with the Windows Sound System.

Included with full support for these PC popular sound standards, the **OPTI 931/OPTI 931+3D** includes audio cable interface for CD-ROM drives. Also, it has multiple input and output ports for recording and playback of stereo sound.

1.1 The OPTI 931/OPTI 931+3D Sound Card Features

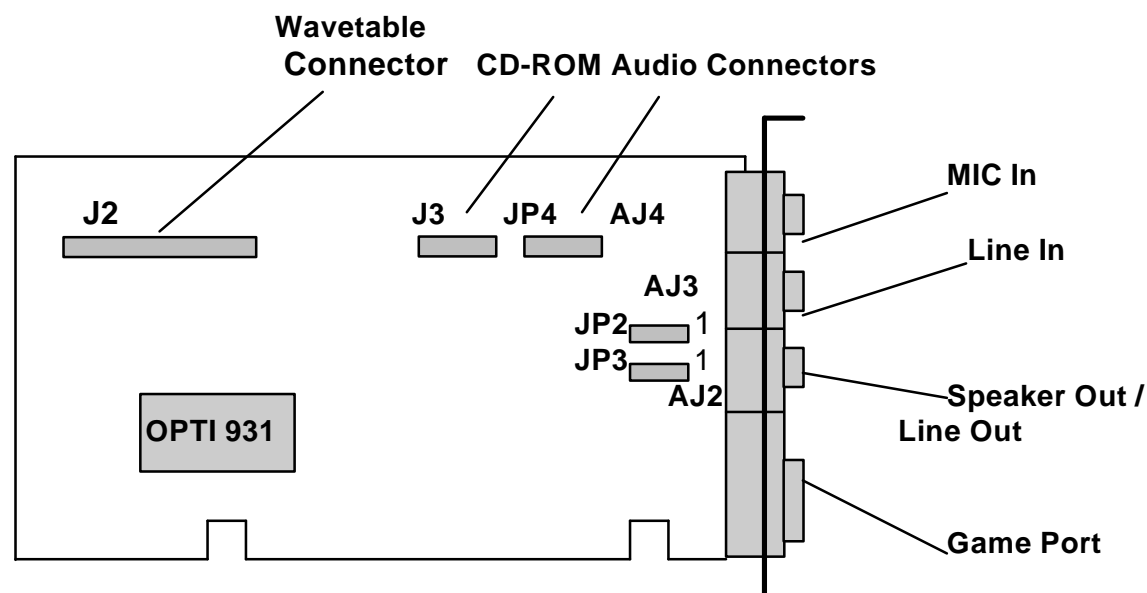The *OPTI 931/OPTI 931+3D* is a fully featured sound card which includes the following :

- 16 bit full duplex plug & play stereo sound
- 22 voice 52 operators FM Music Synthesizer
- Integrated 16-bit A/D and D/A converters
- Maximum sampling rate up to 48KHz for stereo recording and playback
- 7 channel mixer - 5 stereo & 2 mono
- Software volume control for both record and playback
- Built in 2 watts per channel stereo power amplifier
- Connector for Mic in, Line in, Line out/ Speaker out, Wavetable
- Game port for joystick or MIDI device
- Plug and Play Features 1.0a
- Optional built-in '3D' features (Model # 23262 only)

1.2 What is in your package ?

You should have the following items in your package :

- Model # 23212 OPTI 931 or   Model # 23262 OPTI 931+3D Sound Card
  MMCD CD-ROM containing all drivers, utilities and manuals
- Hardware Installation, product layout & troubleshooting manual

2. Installation

Wavetable Connector   **CD-ROM Audio Connectors**

J2   J3   JP4   AJ4

AJ3

JP2 ____ 1
JP3 ____ 1

AJ2

OPTI 931

MIC In

Line In

Speaker Out /
Line Out

Game Port

Layout of OPTI 931 (OPTI 931+3D) Sound Card

Jumpers and Connectors Description

J2	Wavetable Connector
J3	GSGS CD-ROM Drive Audio Cable Connector ***see below
J4	SGGS CD-ROM Drive Audio Cable Connector ***see below
J5	Game Port Connector
AJ2	Speaker Out/ Line Out Connector
AJ3	Line In Connector
AJ4	MIC In Connector

JP2 & JP3 :
2-3 = Enable on board amplifier   (AJ2 = SPEAKER OUT Connector)
1-2 = Disable on board amplifier   (AJ2 = LINE OUT Connector)

Notes :
i) The factory default setting is 2-3
ii) Uses 2-3 setting - when connect the sound card to normal computer speakers
iii) Uses 1-2 setting - when connect the sound card to self-power devices
*   (e.g. Hi-Fi system, amplifier)*

GSGS / SGGS : CDROM to Sound Card Audio Cable connections
This card has audio connectors for Panasonic, Sony & Mitsumi standard Audio Cables...

Panasonic standard	=	connect to GSGS
Sony standard	=	connect to SGGS
Mitsumi (reverse cable on Panasonic) standard	=	connect (reverse) to GSGS

2.1 Non Plug 'n' Play System Setup & Configuration

Note that if your system is not PnP compatible, the default configuration is as follows:

Operation Mode	Sound Blaster Pro Compatible
IRQ	5
DMA Channel	1
I/O Port Address	220h
CD-ROM Interface	None

2.2 Software Driver Installation

2.21 DOS ONLY Driver Installation

1. Insert the MMCD to your CD-ROM drive.
2. To locate the DOS ONLY driver change directory to **d:\eng\931\dos**
3. Type **931dos.bat**
4. This will run an installation program which will make directories and load the DOS drivers. Please follow the on-screen commands.

2.22 DOS & Windows 3.1 Combined Driver Installation

1. Insert the MMCD in to your CD-ROM drive and run the MMCD program. Go to the Opti931 Cost Saver 3D page and click on the **Windows 3.1x Driver** button under the 'Install' section. The driver will load automatically.
2. The driver installation program will appear.
3. Click on the '**NEXT**' button to begin installation.
4. You will be prompted to select a drive and directory. The default is C:\ OPTI931.
5. Press '**NEXT**' , the installation program will begin.
6. When the files are copied, reboot your computer system and Driver Installation is completed.

Note : *If your system does not support Plug & Play, you will have to make your configuration settings under the 'Configuration & Sound-Test' menu. But if your system supports the Plug & Play 1.0a specification, most of these settings will not be user selectable.*

3

2.23 Windows 95 Driver Installation

Note : Install the Sound Card into the motherboard only after the Windows '95 has already installed into the new HDD of the new system, then restart the system and follow the procedure below..

1. Install the Sound Card on the motherboard, and power on the system.
2. Windows '95 will automatically detect the sound card.
3. Select the "**Driver from disk provided by hardware manufacture** " and, with the MMCD already loaded into your CD-ROM drive - direct Windows to the location of the Windows '95 driver - **d:\eng\931\win95**
4. This will complete the Windows '95 installation.

2.24 Windows NT 3.51 Driver Installation

1. Start Windows NT in Administrator mode.
2. Choose the Drivers icon in the Control Panel Window.
3. Choose the Add button in the Drivers dialog box.
4. Select "Unlisted or Updated Driver" and choose the OK button.
5. Insert the MMCD to your CD-ROM drive
6. The location of the Windows NT 3.51 drivers is   **d:\eng\931\winnt35**
7. Install the driver and choose the OK button.
8. A setup dialog box will appear.
9. Select the I/O address, Interrupt, and DMA for OPTi 82c93x.
10. Choose the CD-ROM Interface Settings for selecting whether to enable or disable the on-board IDE CD-ROM interface.
11. Choose the OK button when you finish selecting the settings.
12. Choose the Restart Now button to have the new driver and any changed driver settings to take effect when Windows NT restarts.

CHANGING DRIVER SETTINGS AFTER INSTALLATION
Driver settings can be changed after installation.
1. Log on to Windows NT in Administrator mode.
2. Choose the Drivers icon in the Control Panel Window.
3. Select OPTi 82c93x in Installed Drivers Dialog box.
4. Choose Setup button.
5. Follow instructions 11,12 as above to finish the changes.

## 2.25 Windows NT 4.0 Driver Installation

1. Double click **My Computer**
2. Double click **Control Panel**
3. Double click **Multimedia**
4. Click **Devices**
5. Click **Add**
6. Select **Unlisted or Updated Drivers**, then click **OK**
7. Insert the MMCD in to your CD-ROM drive and type in the path into the command line   **d:\eng\931\\winnt4**
8. Follow the instructions of the drivers (select I/O, IRQ, DMA etc)

3.0   3D Sound and Binaura 3D Sound Technology explained

Everyone knows what stereo sound is.   But how the brain perceives it, is important in order to better understand 3D sound. For example, if a piano sound is played through just the left speaker then we will perceive the sound as coming from the left side. If the same sound (and same level, or volume, of sound) is also passed through the right speaker then it will create the effect of the piano sound coming from the center of the two speakers - in essence from a "phantom" speaker.   By manipulating the levels of the audio signals to the left & right speakers, and then adding 'effects' to them, it is possible to create up to two extra "phantom" speakers - thus giving us 3D Sound. Further to this we must then understand two more '3D terminology's' - **Sum   and   Difference**..

Sum describes the information of each monophonic audio signal sent to the left & right speakers (in other words - *the sound, and to which speaker).*   **Difference** is the information we have when we look at the left & right signals in terms of *level, timing/delay and frequency.* By subtracting the **Difference** of the right signal from the **Difference** of the left signal we come out with the all-important 'spatial' information which characterizes stereo program material - and it is this which can be manipulated to produce **3D** sound.

The type of 3D sound used on this sound card was developed by a company called *"Binaura"* .   This 3D technology has been used extensively and successfully by Creative Labs on their range of Sound Blaster sound cards.   This type of 3D is not dependent on a specific chipset (like ES938) and software drivers, but more a mixture of sound card layout (the specific design of the routings of the audio signals, which are made when designing the PCB) and some passive components such as resistors and capacitors.   This technology 'delays' and 'effects' the audio signals just enough in order to create the 'spatial' information so crucial to achieving good 3D Sound.   The ensuing results of the *"Binaura"* design are an excellent quality of 3D sound which does not require software drivers, and is cheaper through design (not requiring expensive R&D & production investment in to core logic production). This type of technology is incorporated on the OPTi931 sound card, and ESS1868 3D Sound Card.

Microsoft® Internet Explorer
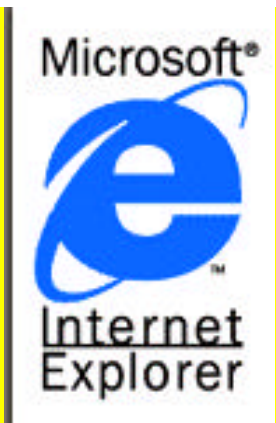
Useful E-Mail Addresses

If you find that the installation driver for your particular operating system is not included on this MMCD CD-ROM then please visit one of the following web sites for further information..

www.opti.com

OPTi Home Page

www.mmcd.com

MMCD Home Page

Thank you