

DOS Days

Old PC Computing Resource

[Home](#)
[Hardware](#)
[Software](#)
[Games](#)
[Topics](#)
[Contact Us](#)

Aureal Semiconductor

Aureal Semiconductor was a sound card chipset manufacturer for the IBM PC compatible market in the late 90s. Following the sad demise of the [Media Vision](#) company in 1996, the company reformed under this new company name. Aureal were probably most famous for their *Vortex* line of audio chips that sound card manufacturers based their cards around. Later that same year they merged with *Crystal River Engineering* whose skills in 3D sound processing led to Aureal producing the *Aureal 3D (A3D)* chip.



Useful Links

[3D Audio Games](#)
[Aureal Downloads](#)
[Wavetable Audio](#)

Site Search

 

Until *Vortex 2* arrived in 1998, Aureal only designed and sold their audio chips - they did not produce their own sound cards - but this changed with the introduction of a three-card range comprising *Aureal Vortex 2 SQ1500*, *Aureal Vortex 2 SQ2500* (which sold for \$99 for the plain OEM variant), and *SQ3500 Turbo* (a SQ2500 with DSP daughterboard installed that added a Dolby Digital decoder).

Aureal lasted until a buyout from [Creative Labs](#) in September 2000 after a lawsuit that went in the favour of Aureal, but the costs of the lawsuit (and lost investor confidence) pushed them into bankruptcy.

Sound Card Chipsets

Vortex       

Launched: July 1997

Chipset: Vortex AU8820

Bus: PCI

Chip Revisions: B2



The Vortex audio accelerator chip provided the host card with [3D positional audio](#) capabilities using just 2 speakers or headphones. It also supported DirectSound and DirectSound3D like the [Sound Blaster Live!](#) cards did, and was compliant with the AC'97 codec standard. Its built-in Aureal 3D (A3D) version 1.0 was considered better at 3D positional audio reproduction than Creative's EAX at the time, but was not as well supported in games. A3D 1.0 uses software-

based Head-Related Transfer Functions (HRTF) to simulate the effect of a sound wave traveling into the ear and modifies that sound wave to make it sound as if it is coming from a specific location.

"Under development at Aureal for two years, Vortex is a high-performance PCI audio chip architecture. Enabled by the high bandwidth PCI-bus and the AC'97 CODEC specification, Vortex is designed to dramatically raise the quality level of PC audio by delivering a new wave of advanced features including positional 3D audio, pro-quality wave table music synthesis, DirectSound™ acceleration and telephony support. Vortex enables advanced quality and features while maintaining full support of existing DOS legacy audio functions. Unlike general purpose DSP based solutions, Vortex consists of several highly optimized silicon engines that have been designed for optimal processing of audio functions. As a result, the Vortex architecture offers the most competitive price/performance benefits to OEM customers.

The first device based on this architecture is the Vortex AU8820. It delivers over 300 MIPS of digital processing optimized for high-quality audio algorithms. This acceleration power works in combination with MMX-based software on the host CPU that performs hardware resource allocation and control functions. "The availability of Aureal's first Vortex chip marks a significant milestone in the audio industry", said Kip Kokinakis, President and CEO of Aureal. "The AU8820 is Aureal-designed from the ground up. Compared to today's PC audio subsystems, Vortex is a giant leap forward in both quality and performance, and it will significantly enhance PC users' audio experiences.

"Aureal's Vortex AC'97 digital audio controller solution is a key ingredient in enabling Intel's Audio'98 road map. Their solution combines all of the advantages of the PCI bus, the AC'97 standard and Intel's MMX™ architecture to improve PC audio to new levels of quality", said Russ Hampsten, Audio Marketing Manager at Intel and co-author of Intel's AC '97 and Audio '98 road maps."

Vortex is introduced at a time when the PC industry is on the verge of a major move from ISA based legacy audio subsystems towards new PCI based solutions. PCI audio promises significantly higher audio quality, advanced features and cost-savings thanks to the elimination of the ISA bus. "Audio on the PCI bus is a new market category that will deliver high-quality audio to the PC platform, and will see explosive growth starting in 1998", said Dean McCarron, Principal at Mercury Research. "Now that their standard-setting A3D audio technology has been embraced strongly by game developers and PC multimedia vendors, Aureal is moving to the next level with their Vortex chip, a full-featured, next-generation audio platform that is very well targeted for the emerging PCI audio market", said Bert McComas, President of InQuest Market Research." Aureal Semiconductor Press Release, 14th July 1997

The [wavetable synthesizer](#) has 64-voice capability with 32 of those rendered in hardware (by loading up to 4 MB of sample instruments in either .ALR or [DLS](#) (Downloadable Sound) v1.0 format into system RAM), and a further 32 that can be rendered in software. DLS dates back to 1990 and is supported by Creative's [Sound Blaster Live!](#) cards as well as any sound card with an Analog Devices AD1888, AD1980 or AD1985. Wavetable audio is only possible in Windows (or a DOS command prompt inside Windows), not in real DOS.

Vortex also provides an "Enhanced Game Port" mode where the soundcard handles polling the joystick. This allows for certain peripherals that send and receive digital data packets over the game port to work.

Cards with the Vortex chip provided [Sound Blaster Pro](#) emulation in DOS, in addition to MIDI, but were designed to run in Windows 95, 98 or ME. They do have some compatibility issues running in later operating systems. Earlier cards had a separate Analog Devices DSP for their A3D support. There are also issues with motherboards running a [VIA](#) chipset for AMD K7 processors. A fix exists for a problem when using Vortex 1 on VIA chipset-based boards. This can be downloaded [here](#).

Cards that used the AU8820 include:

- Yamaha [WaveForce XG?]
- [Turtle Beach Montego A3DXstream](#)
- [Diamond Monster Sound M80*](#)
- Intresource TeraSound A3D PCI
- Innwave Aureal Vortex PCI
- MediaTek Sound Image Symphonic PCI-1

- [Diamond Monster Sound MX200*](#)
- [Diamond Sonic Impact S90\(A/B\)](#)
- Gallant Audio Storm A3D
- Aztech PCI 338-A3D
- Genius Sound Maker 64
- Multiwave AudioWave PCI DigitalSound
- Orchid NuSound3D
- [Pine Technology PT-2628 Schubert 64 A3D-1](#)
- Shark Predator 3D PCI*
- Digitan Systems DSAC-600
- Skywell Magic Sound
- [TerraTec XLerate PCI](#)
- Xitel Storm VX*

**These cards used a custom version of the Vortex chip, and so typically require the use of drivers from the sound card manufacturer instead of the Aureal reference drivers.*

Some of the games that directly supported A3D include Half Life, Unreal, Quake II, Star Wars: Jedi Knight, Quake III and SiN. For the full list of 3D audio-supported games, [click here](#).

Vortex 1 was also embedded on a number of motherboards - these had the designation AU8808. Such motherboards include the [BCM IN440ZX](#), Intel 440ZX Napoli, and some from [PC Chips](#) where the chip is branded "A3D SoundPro". These PC Chips motherboards may include M559, M570, M571, M573, M575, M577, M715, M717, M720 and M725, though I've not confirmed each of these models. There were at least two driver CDs shipped with PC Chips mobos that definitely contain A3D drivers, version 1.9 and v2.3.

[AU8820 Datasheet](#)

Vortex 2       

Launched: August 1998

Chipset: Vortex AU8830

Bus: PCI

Chip Revisions: A2, B0

Build Codename: ASP403 (Aureal Sound Processor 4th Gen, rev. 03)



The Vortex 2 audio accelerator chip took the original A3D 1.0 to version 2.0, with hardware-accelerated HRTF (Head-Related Transform Functions). It also added a hardware-based 10-bands-per-channel graphic equaliser, 96dB SnR (signal-to-noise ratio), custom crosstalk cancellation circuitry (for improved noise), as well as support for 4-speaker, 5.1 or 7.1 home theatre arrangements. A3D 2.0 builds on the basic concept from A3D 1.0 by adding in "wavetracing" to simulate the effect of a sound wave traveling through a three dimensional environment - all done using the 3D geometry of the room from the games engine. This primarily means reflections off walls, occlusions by walls, Doppler effect, acoustic reverberation, and atmospheric absorption.

VORTEX 2

The wavetable synthesizer is as *Vortex 1* with 64 total voices, The first 32 voices are loaded into system memory via an up to 4 MB sample instrument file in either .ALR or [DLS](#) (Downloadable Sound) v1.0 format. A further 32

voices can be added which are rendered in software. The DLS format dates back to 1990 and is supported by Creative's [Sound Blaster Live!](#) cards as well as any sound card with an Analog Devices AD1888, AD1980 or AD1985.

Revision B of the Vortex 2 chip runs at a slightly faster clock speed than Revision A. Aside from that they are identical.

"Aureal has elevated PC audio in the past with their A3D technology, and now provides the next logical step with A3D 2.0 and the hardware to make it work - the Vortex 2, with tons of support by the gaming community, this is the must-have audio platform for the future." Kip Kokinakis, CEO, August 1998

A3D 2.0 was fully backward-compatible with A3D 1.0 implemented in the original Vortex chip, and is exceptional with its 3D audio capabilities, especially when using headphones. The 4 MB wavetable samples that come with the drivers are of average quality only, however with third-party wavetable files available this can be improved easily. [Wavetable audio](#) support is only available in Windows (or a DOS command prompt inside Windows), not in real DOS.

In pure DOS, [Sound Blaster](#) and [Sound Blaster Pro](#) emulation is achieved by running a TSR called AU30DOS.COM. It looks for a SET BLASTER= line in your environment variables.

Vortex2, like the Vortex, also provides an "Enhanced Game Port" mode where the soundcard handles polling the joystick. This allows for certain peripherals that send and receive digital data packets over the game port to work.

Cards that used the AU8830 include:

- [Diamond Monster Sound MX300](#)
- [Turtle Beach Montego II](#) (Dual channel) and its variants Home Studio, Quadzilla, Plus and VoiceXpress
- Diamond Monster Sound MX25 daughterboard
- TerraTec XLerate Pro PCI
- VideoLogic SonicVortex 2
- Hi-Val PCI 576 A3D
- [Xitel Storm Platinum](#) (Quad channel, optical out)
- TechWorks Power Vortex 2
- Absolute Outrageous 3D Sound
- Aureal Vortex 2 SuperQuad (Quad channel, optical S/PDIF out, Rev.A chip)
- Aureal Vortex 2 SQ2500 (Quad channel, optical coax out, Rev.B chip)
- Aureal Vortex 2 SQ3500 (an SQ2500 with DSP daughterboard - quad channel)
- I/O Magic MagicWave V2

Some of the cards above only have a 2-channel CODEC, e.g. [Turtle Beach Montego II](#), whereas others such as the SQ2500 ("SuperQuad") and SQ3500 have 4 channels.

The *Aureal Vortex 2 SQ2500* was Aureal's own sound card. Up until this point they had not ventured into the world of producing their own sound card, having worked exclusively on selling their 3D audio chip separately to actual sound card manufacturers. The SQ2500 added an S/PDIF RCA jack to the faceplate which was fairly rare on *Vortex 2*-equipped cards (some have a TosLink

digital out instead), as well as a [Wave Blaster](#)-compatible wavetable header. The card was also bundled with games titles Drakan:Order of the Flame (Psygnosis), Heretic II (Raven Software), and a demo of Slave Zero (Accolade).

They also later re-sold [Diamond's own MX300](#) card, branded as the SQ2200 (I guess the lower number was chosen so as not to make it appear a better card than their SQ2500).

Windows support for *Vortex 2* focussed on Windows 95, 98 and ME. There are some beta drivers out there for Windows 2000, but this was released right around the time Aureal were going bankrupt. The first release of Windows XP included drivers for *Vortex 2*-based cards which provided decent support. Microsoft later released updated drivers (2.5.12.01.156), which removed many features (Aureal A3D support, hardware acceleration, Aureal [wavetable](#) and S/PDIF support). Using the Win 95/98 driver versions 4.06.2048 or 4.06.2050 apparently work well with Windows 2000.

Vortex 2 was also included in some *Sony VAIO* and *Alienware* PCs at the time.

Also of note is Creative Labs' [EMU10K](#)-based cards such as the [SB Live!](#) range which only emulates A3D1.0, it is known that this isn't true A3D - instead the wrapper simply takes A3D instructions and converts them into DirectSound 3D instructions, which results in a poorer 3D solution than true A3D. So for A3D 1.0 or 2.0 titles, use a true Aureal Vortex 2-based card. If you want EAX 3D audio in your games, use a [Creative](#) card that supports it (Aureal cards don't support EAX). It is entirely feasible to run a Vortex 2 card alongside an EAX-supported card for the broadest flexibility.

More Images



Vortex Advantage



Launched: >1998(?)

Chipset: Vortex AU8810

Bus: PCI

A flavour of Vortex 1 was re-released after [Vortex 2](#), called *Vortex Advantage*. This was essentially a cost-reduced card based on [Vortex 1](#) but with the 10-band graphic equalizer from the Vortex 2, and 256-voice MIDI. It sold for as little as \$45 for a full sound card.



The cards were basic, with just a CD-In port on the card face, and the usual base Microphone, Line-In and Speaker Out ports on the faceplate, along with the Game/MIDI port. They did not come with a wavetable connector or any other jumpers. The accompanying CD-ROM comprised drivers for Windows 95/98 and NT 4.0, a quick start guide in PDF format, and four demo programs.

According to an Aureal spec sheet, the *Advantage* had the following specifications:

- Wolfson Microelectronics' dual-channel 18-bit stereo codec XWM9701A complies with the AC'97 ver specification. 1.03

- 48 kHz sampling supported
- Built-in analog mixer with support for four different stereo inputs
- Full-duplex, 48kHz digital recording and playback
- 8 streams of A3D 1.0 with DirectSound3D support
- 16 DirectSound acceleration threads
- 256-voice wavetable synthesizer (4 MB samples)
- Reverb and effects (chorus, delay, flange, distortion, wow, etc.)
- General MIDI and DLS 1.0 support
- Sound Blaster Pro support in MS-DOS and MS-DOS window
- 10-band stereo equalizer with spectrum analyzer

The wavetable synthesizer is the same as that found in Vortex 1.

The graphic equaliser utility has 5 preset modes and a 'user' mode. *Advantage* runs well in DOS, including the wavetable synth.

Cards that used the AU8810 include:

- Aureal Vortex "SuperQuad" SQ1500
- Aureal Vortex Advantage PCI
- I/O Magic MagicWave V1 A3D PCI
- Hi-Val PCI A3D Advantage
- Absolute Outrageous 3D Sound Lite

You need a specific driver if you want to get quad-channel audio and S/PDIF output from the AU8810, as the Aureal reference driver only supports two-channel and no S/PDIF.

[AU8810 Datasheet](#)

[More Images](#)



[Home](#) | [Contact Us](#)

Copyright © 2023 DOS Days