Aureal

3D
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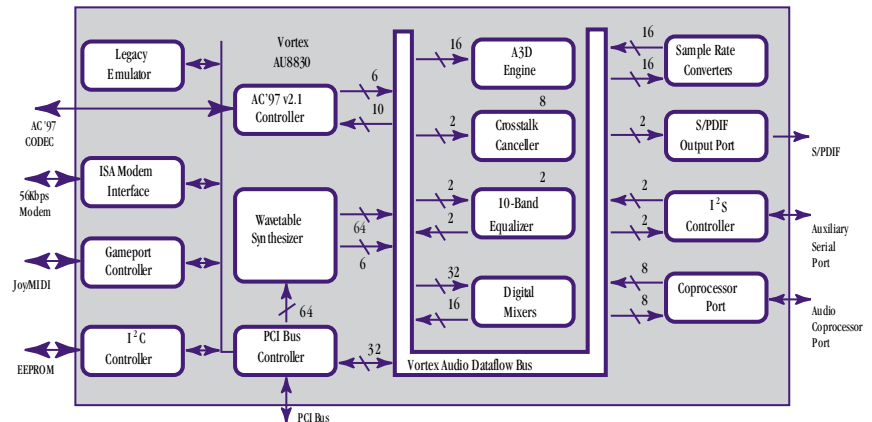
VORTEX® 2 AU8830

A3D™ PCI Audio Controller Chip

ADVANCED FEATURES

- Hardware A3D (16 sources)
- A3D 2.0™ Wavetracing acoustic engine (64 wall reflections)
- Up to 96 DirectSound™ hardware buffers
- 320-voice wavetable engine (64 h/w, up to 256 s/w)
- Hardware 10-band stereo graphic equalizer (96dB SNR)
- Legacy audio support in real-mode DOS and DOS boxes
- S/PDIF output (32/44.1/48/96kHz sample rates)
- Hardware crosstalk cancellation (headphone/speaker output)
- 96 channels – complete 16-bit 48kHz operation

BASELINE FEATURES

- Windows™ 98/95 and NT 4.0/3.0 drivers; WDM ready
- DirectSound3D Acceleration
- Hardware sample rate conversion (80 channels, 96dB SNR)
- Hardware mixers (32 channels, 16 outputs)
- PCI v2.2 bus master with burst-mode, scatter/gather support
- AC'97 v2.1 port (AC'98 modem ready)
- Gameport with MIDI I/O and DirectX acceleration
- ISA, DSP, I²S, and I²C ports
- 3.3V operation, 5V compatible; 128-pin PQFP package

Total Digital Audio Solution

Designed from the ground up to accelerate digital audio, the Vortex AU8830 design interconnects multiple custom audio processing blocks via the reconfigurable Vortex audio Dataflow Bus (VDB). No other audio architecture offers equivalent flexibility and modularity. With 96 DMA channels to exchange data with the host across a PCI bus master interface, and an AC'97 2.1 port for audio I/O, the AU8830 has enough bandwidth to handle any audio task.

The AU8830 is pin-compatible with Aureal's existing AU8820 AC'97 audio processor, and so existing Vortex system designs can be upgraded instantly. Aureal's Vortex family includes high-quality, easy-to-install drivers for Windows 95 and Windows 98 (Plug-and-Play), Windows NT 4.0 WDM miniport, Windows NT 3.512.

A3D 2.0™ Engine in Hardware

Widely adopted by leading game developers, A3D (Aureal 3D) replicates the 3D audio cues that listeners experience in the real world for both stationary and moving sound sources. A3D uses premier-quality head-related transfer functions (HRTFs), atmospheric absorption, and Doppler effects to create positional cues to produce an interactive, immersive audio field, while requiring only two speakers (quad speaker and other multispeaker configurations are supported, but not required).

Handling up to 16 A3D sources, the Vortex 2's hardware A3D engine accelerates games written to the A3D standard as well as DirectSound3D games. Full-custom HRTF and atmospheric filters provide complete 16-bit, 48kHz quality.

Vortex 2 additionally supports Aureal's next-generation A3D 2.0 standard. Using Aureal Wavetracing™ technology, A3D 2.0 renders real-time acoustics based on the environment's 3D geometry. Sound reflections, occlusions, and reverb take acoustic realism to new heights as sounds echo around rooms and burst through doorways. Vortex 2 supports optimized rendering modes for headphones, 2 speakers, 4 speakers, or more.

AU8830

320-Voice Wavetable Synthesis (64 Hardware, up to 256 Software)

The Vortex 2's wavetable synthesis uses advanced techniques, such as fourth-order interpolation and sweepable filters with resonance, to provide a General MIDI 1.0 64-voice synthesizer that accepts DLS 1.0 samples and can accelerate DirectMusic audio. Vortex minimizes wavetable cost by storing sample data in host memory rather than external RAM or ROM. When running DirectSound games that do not make use of wavetable synthesis, the 64 wavetable channels are available to accelerate DirectSound streams or provide A3D 2.0 acoustic reflections. Vortex 2 is configurable so that up to 256 software-based wavetable voices are available, depending on the CPU.

DirectSound Acceleration and Beyond

New PC games use the Microsoft DirectSound standard, part of the DirectX subsystem. The AU8830 accelerates up to 96 DirectSound audio buffers via PCI streaming, sample rate conversion, and digital mixing in hardware. The AU8830 contains a discrete 32-input, 16-channel digital mixer and 16-channel sample rate converter for DirectSound acceleration. The wavetable engine provides sample-rate conversion and volume adjustment for an additional 64 audio channels when not used for wavetable synthesis.

Complete Legacy Support

Patented Sound Blaster Pro emulation means that the AU8830 is a hassle-free solution that still supports older games in both Windows DOS boxes and real-mode DOS (without Windows). Unlike other PCI-based systems that merely claim legacy support because they can run carefully selected games, Aureal's integrated hardware support has been designed to ensure complete legacy compatibility. Verified operation has been proven on over 300 DOS games. In addition, the wavetable synthesizer is available for high-quality music in Windows DOS boxes.

Equalization and Crosstalk Cancellation

The AU8830 contains a hardware-based, graphic equalizer with 10 bands per channel to provide programmable, stereo equalization with a 96dB signal-to-noise ratio over a 20Hz~22kHz range. The equalizer also performs level metering, allowing real-time graphical display of the current output level for each equalization band.

The custom crosstalk cancellation circuitry uses a biquad crossover filter to optimize left and right sound channels for more effective A3D playback in stereo speakers.

Multiple I/O Ports

The AU8830 provides a wide range of glueless interfaces. The flexible CODEC interface includes a low-jitter clock output, eliminating the need for an extra crystal, and supports AC'97v2.1 and standard audio CODECs. The AU8830 can access and control CODEC special functions, such as stereo expansion. The AC'97 port is also AC'98 modem ready.

Supplemental I²S, quad CODEC, and parallel host ports support additional sound functions and DSPs, such as audio coprocessors and MPEG decoders. The Vortex gameport, as well as supporting standard analog/digital joysticks and MPU-401 MIDI I/O, also incorporates DirectX acceleration circuitry that accelerates DirectX gameplay and improves system speed by 10% or more.

Flexible Power Management

As well as supporting ACPI and PCI v2.2-compliant power management extensions, the AU8830 supports AC'97 2.1 wake events (incoming fax/modem calls turn on the computer), audio amplifier power-down, and ROM power-down. The AU8830 is 5V-tolerant, meaning it can operate in a 5V signaling environment without external components.

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