Melody™ Floating-Point Audio Encoders/Decoders

MULTICHANNEL FLOATING-POINT AUDIO ENCODER/DECODER POST PROCESSOR REFERENCE DESIGNS

OVERVIEW

Analog Devices' Melody reference design family includes multichannel audio decoders, encoders, and post-processors for digital audio designs using DSPs (Digital Signal Processors) in home theater and automotive audio receivers.

Featuring 32-bit audio quality, Melody reference designs autodetect and decode 5.1-channel digital audio formats in real-time, enabling end users to enjoy a theater-quality audio experience in their living rooms with popularly-priced consumer products. By including a floating-point SHARC® DSP processor, Melody reference designs support multiple algorithm combinations. This enables OEMs to produce high-quality, low-cost designs featuring decoder algorithms and post processors for DTS,® Dolby™ Digital, Dolby Pro Logic, Dolby Headphone, THX®Select, THX Ultra and THX Surround EX, HDCD, MPEG1 Audio Layer 3 (also known as MP3), MPEG2 Audio Layers 1 and 2, MPEG2 AAC, MLP,™ PCM, WaveSurround,® and SRS® 3D Sound.

The Melody reference design product line additionally includes audio encoders for Dolby Digital Consumer Encoding, and MPEG-1 Audio Layers 1 and 2.

Design platforms are available based on the ADSST-21065L and ADSST-21061L SHARC DSP processors.

The decoders support all of the bit rates (32–4,096 kbps) and sampling frequencies (16, 22.1, 24, 32, 44.1, 48, 88.2, 96 kHz per channel) specified by the encoding standards. The decoders also support additional features specified by the standards—including THX Post Processing technologies Bi-amplification,® Re-equalization,® Adaptive Decorrelation® and Timbre Matching.®

HIGHLIGHTS

- Industry's first 32-bit floating-point implementation for decoding the leading encoded audio content

- Decoders for Dolby Digital, Dolby Pro Logic, DTS, HDCD, MP3, MPEG2 Audio Layers 1 and 2, MPEG2 AAC, PCM, WaveSurround and SRS 3D Sound

- Post Processors for HDCD, Dolby Headphone, THXSelect, THX Ultra and THXSurround EX, WaveSurround, and SRS 3D Sound

- Decoders operate in real-time and process all combinations of these digital audio encoded algorithms

- Ability to autodetect and display bitstream information

- Encoders for Dolby Digital Consumer Encoding and MPEG-1 Audio Layers 1 and 2

- Evaluation boards, sample applications and all necessary software support (drivers, etc.) available

ANALOG DEVICES

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Audio Decoders—Specifications Summary

	Dolby Digital	Dolby Pro Logic	Dolby Headphone	DTS	MLP (Meridian Lossless Packing)	HDCD	PCM
Bit Rate Ranges	64–640 kbps			32–1,536 kbps		N/A	
Typical Data Rate for 5.1 Channels	384 kbps			1.509 Mbps		N/A	
Data Reduction	3.4:1 to 15:1 (Typical)			3:1 (Typical)	2:1 (Typical)	24:16	None
Sampling Rate	32, 44.1, 48 kHz	32, 44.1, 48 kHz	44.1 and 48 kHz	48 kHz	44.1, 48, 88.2, 96, 192 kHz	44.1, 88.2, 96, 176.4 and 192 kHz	48 kHz
Word Length	32 bits	32 bits	32 bits	32 bits	32 bits	32 bits	32 bits
Number of Discrete Channels	5.1	3.1 + 2 mono rear surrounds	5.1 input; 2-channel binaural output	5.1	5.1	5.1	5.1

	MP3 (MPEG1 Layer 3)	Lucasfilm THX Select	Lucasfilm THX Ultra	Lucasfilm THX Surround EX	MPEG2 Layers 1 and 2	MPEG2 AAC	Wave Arts WaveSurround	SRS 3D
Bit Rate Ranges		N/A	N/A	N/A				
Typical Data Rate for 5.1 Channels	N/A	N/A	N/A					
Data Reduction		N/A	N/A	N/A				
Sampling Rate	16, 22.1, 24, 32, 441.1, and 48 kHz	32, 44.1, and 48 kHz	32, 44.1, and 48 kHz	32, 44.1, and 48 kHz	16, 22.1, 24, 32, 44.1, and 48 kHz	16, 22.1, 24, 32, 44.1, and 48 kHz	11.025, 22.05, 44.1, and 48kHz	32, 44.1, and 48 kHz
Word Length	24 bits	24 bits	24 bits	16 bits	16 bits	16 bits	24 bits	20 bits
Number of Discrete Channels	5.1	5.1	5.1	3.1 + 3 matrix	5.1	5.1	5.1 input, 2-channel binaural output	5.1

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Audio Encoders—Specifications Summary

	Dolby Digital Consumer Encoding	MPEG1 Layers 1 and 2
Bit Rate Ranges		32–448 kbps
Typical Data Rate for 5.1 Channels		N/A
Data Reduction		24:16
Sampling Rate	48 kHz	44.1, 88.2, 96, 176.4, and 192 kHz
Word Length	20 bits or greater	24 bits
Number of Discrete Channels	2.0 (5.1 in the future)	5.1

Development Platform

A stand-alone PEGASUS evaluation board includes an ADSST-21065L KST-264 SHARC DSP, four AD1854 DACs, one stereo ADC, one 96 kHz DAR, four SPDIF transmitters, an 80C31 microcontroller, an RS-232 port, and a USB port.

Ordering Information

The Analog Devices multichannel Melody Decoder Reference Designs must be ordered under the part number ADSST-PEGASUS-SDK for the stand-alone reference design. This includes the evaluation board with an evaluation copy of the software, schematics, etc.

Designers of products using this reference design also will be required to sign a license agreement with the respective license holder — viz., Dolby Labs., DTS Inc., Lucasfilm THX, Pacific Microsonics, etc.— to use the appropriate code, and produce proof to Analog Devices of having successfully completed the appropriate licensing procedures before final product can be shipped to them. The final product will be shipped from Analog Devices and will include the decoder chipset and software; customers will be required to sign license agreements with Analog Devices and separately pay system royalties to the respective license holder.

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