# Melody<sup>m</sup> 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<sup>®</sup> 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,<sup>®</sup> Dolby<sup>™</sup> Digital, Dolby Pro Logic, Dolby Headphone, THX<sup>®</sup>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,<sup>™</sup> PCM, WaveSurround,<sup>®</sup> and SRS<sup>®</sup> 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 Biamplification,<sup>®</sup> Re-equalization,<sup>®</sup> Adaptive Decorrelation<sup>®</sup> and Timbre Matching.<sup>®</sup>

#### 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



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#### MLP (Meridian Dolby **Dolby Pro** Lossless Headphone **Dolby Digital** Logic DTS Packing) HDCD PCM 64-640 kbps N/A **Bit Rate Ranges** 32-1,536 kbps **Typical Data Rate** 1.509 Mbps for 5.1 Channels 384 kbps N/A 3.4:1 to 15:1 **Data Reduction** 3:1 2:124:16 None (Typical) (Typical) (Typical) **Sampling Rate** 32, 44.1, 32, 44.1, 44.1 48 kHz 44.1, 48, 88.2, 44.1, 88.2, 96, 48 kHz 48 kHz 48 kHz 96, 192 kHz and 48 kHz 176.4 and 192 kHz Word Length 32 bits Number of 5.13.1 + 25.1 input; 5.15.15.15.12-channel Discrete mono rear Channels surrounds binaural output MP3 MPEG2 (MPEG1 Lucasfilm Lucasfilm Lucasfilm THX Layers 1 MPEG2 Wave Arts SRS 3D **THX Select THX Ultra** Surround EX and 2 WaveSurround Layer 3) AAC **Bit Rate Ranges** N/A N/A N/A **Typical Data Rate for** N/A N/A N/A **5.1 Channels Data Reduction** N/A N/A N/A 16, 22.1, 32, 44.1, 32, 44.1, 32, 44.1, 16, 22.1, 16, 22.1, 11.025, 22.05, **Sampling Rate** 32, 24, 32, 24, 32, 24, 32, 44.1, and and and and 44.1, 441.1. and 48 kHz 48 kHz 48 kHz 44.1. and 44.1. and 48kHz and 48 kHz 48 kHz 48 kHz 48 kHz Word Length 24 bits 24 bits 24 bits 16 bits 16 bits 16 bits 24 bits 20 bits Number of 5.15.15.13.15.15.15.1 input, 5.1**Discrete** + 3 matrix 2-channel Channels binaural output

## **Audio Decoders—Specifications Summary**

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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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