MAS 3527H, MAS 3529H

Feb/2002

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Multichannel Audio Decoders with Virtualizer

The audio decoders MAS 352xH represent the second generation of full-feature audio decoding ICs for TV Audio and Home Audio applications. The ICs are designed for converting a compressed digital bitstream or uncompressed audio data into multiple digital output signals. All necessary processing units together with the I/O interfaces have been integrated on a single 44-pin IC.

The MAS 3529H is the multichannel version (5.1 plus Lt, Rt downmix), whereas the MAS 3527H is the virtual surround version, providing three audio output channels (plus Lt, Rt). The MAS 352xH is functional and pin-compatible to MAS 3528E.

Audio Decoding

- Dolby Digital (AC-3)
  Quasi standard on DVD and dominating format for multichannel audio in Digital TV. All Dolby Digital formats from one to 5.1 channels are decoded.
- MPEG-1 Layer-2
  Sample rates from 8 kHz to 96 kHz are supported
- Dolby Pro Logic II
  Creates 5-channel surround sound from any stereo source. Pro Logic II is well adapted to Dolby Digital
- PCM stereo audio data

Interfaces

- Two S/PDIF inputs on chip
- S/PDIF output on chip
- Two I^2S inputs
- Four I^2S outputs
  Multichannel mode (eight channels on one I^2S out) or standard stereo modes
- I^2C control for all the ICs functions and readout of information

Post Processing

- N-2-2 Virtualizer
  Virtual Dolby Digital compliant. Enables multichannel audio playback from two or three loudspeakers. The HRTF-based algorithm creates a realistic surround impression and allows the use of the “Virtual Dolby Digital” logo
- Bass Management
  “Dolby Configurations 0, 1, 2, 3” and “Multichannel Source products I, II”
- Delay lines on chip
  Surround: 2 x 25 ms
  Center: 5 ms
- Deemphasis
  For PCM and MPEG formats, a deemphasis can be applied to the signal.
- Digital Volume +12 dB ... –114 dB

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Miscellaneous

- Automatic Format detection
  No controller interaction needed for standard operation.
  The incoming format is analyzed and the appropriate decoding algorithm is selected automatically.
- Noise Generator
  White- or bandpass-shaped noise available on all output channels. A noise sequencer (as required by Dolby Laboratories) can be programmed.
- S/PDIF loop through
  S/PDIF input signals can be routed to S/PDIF out. An incoming DTS signal is looped through automatically.
- In conjunction with the ICs MSP 44x0G and DPL 4519G, the MAS 352xH forms the Micronas “Digital Multichannel Audio” chip set.
- On-chip clock generation, only one crystal needed for the entire application
- Seven user-programmable I/O pins
- Extra Stereo output
  Even during downmix operation, the IC can provide an extra stereo signal. Pro Logic encoded L_t/R_t or L_o/R_o for headphones and/or line out can be selected.

Evaluation Support

- “DMC-Control” Software Suite:
  - I^2C Driver for PC parallel port
  - Micronas “Visual I^2C”
  - “DMC-Control” Application for the MAS 352x, MSP 44x0G, DPL 4519G chip set
- Evaluation Hardware:
  - I^2C adapter for PC parallel port
  - Micronas Audio Motherboard
  - “Multichannel Audio” application board for the MAS 352x, MSP 44x0G, DPL 4519G chip set

System Architecture

The hardware of the MAS 3527H and the MAS 3529H consists of a high-performance RISC Digital Signal Processor (DSP) and appropriate interfaces.

The DSP is designed as dedicated audio signal processor. All data input and output actions are based on a “non-cycle stealing” background DMA that does not cause any computational overhead.

The firmware implemented into the chips ROM provides all the decoder algorithms, the downmixing, delay line, and I/O handling, so that no download of software is necessary for operation of MAS 3527H and MAS 3529H.

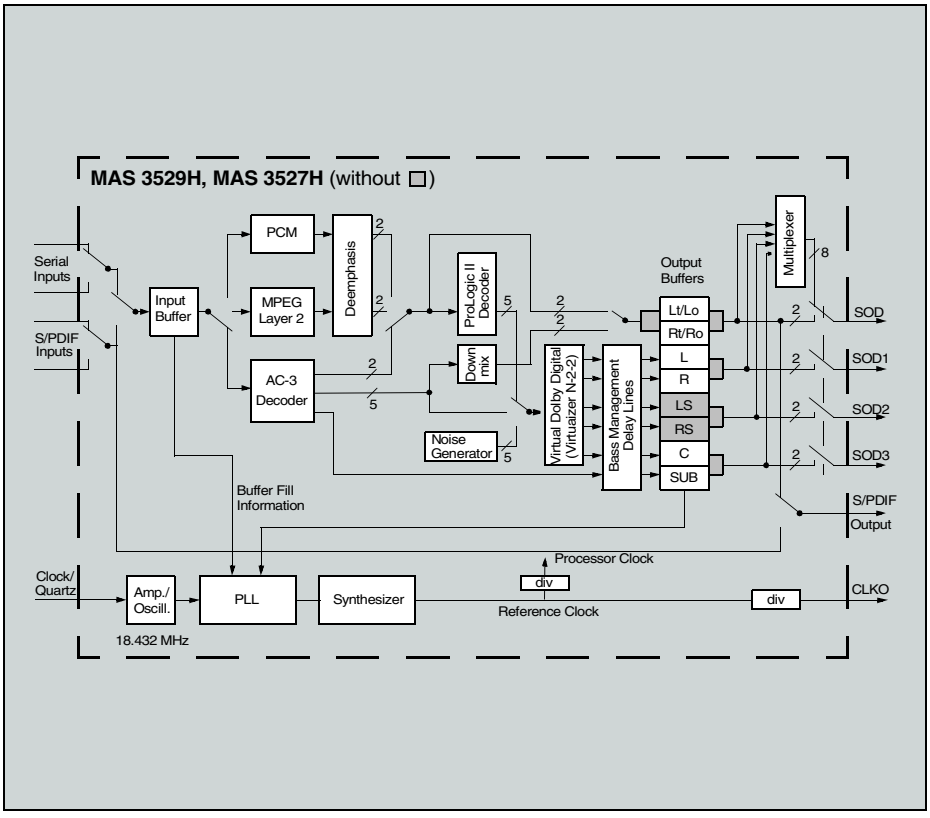

Fig. 1: Block diagram of the MAS 3527H, MAS 3529H

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