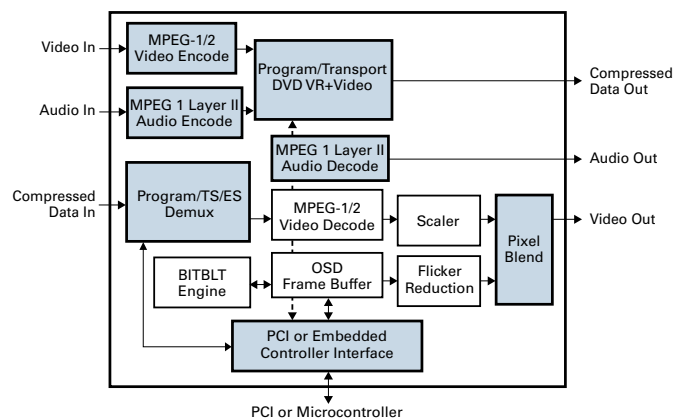**CONEXANT**

MPEG-2 Codec
CX23415

The CX23415 is a low-cost, full-duplex MPEG-2 codec that integrates the functionality of several ICs in a single device

Conexant's broadband communications portfolio includes a comprehensive suite of semiconductor solutions that enable the digital home and information network. The CX23415 codec is the industry's first device to integrate such features as MPEG-2 audio/video encoding and decoding, Transport stream generation, and OSD control in a single chip. The versatile, full-duplex CX23415 actually incorporates the functionality of up to five different chips, allowing Conexant™ to deliver this device at a price point that will enable consumer electronics and personal computer companies to reduce dramatically the cost of designing and manufacturing their next-generation digital video products. Pre-filtering improvements in the CX23415 include built-in linear filters that dynamically change or soften images in the pre-processing stage. As a result, end-users obtain the best possible picture, even as the data rate is reduced and the recording time is lengthened. Other video quality improvements include a dramatically increased motion search range, the de-coupling of motion estimation from encoders, and an adaptive quantization scheme. To reduce the overall cost of the CX23415 and achieve the highest video quality, Conexant devoted significant engineering resources to determining the optimal balance between hardware and software implementation of these processing improvements. The CX23415 incorporates an OSD for graphics control and advanced GUI acceleration to support user interfaces and the display of advanced menus containing broadcast and service information from electronic program guides. The controller includes a BITBLT acceleration engine and deflicker filter. It supports a variety of pixel formats, including 8-bit color index and 32-bit RGBA 8:8:8:8.

Distinguishing Features

- High-quality real-time encoding
- Supports MPEG-2 and MPEG-1
- Programmable GOP lengths
- Increased motion search range
- Reduced data rate and lengthened recording time
- 452-ball PBGA

CX23415 Block Diagram

Part Number	060-002
Description	CX23415 MPEG-2 Codec

CX23415 Features

Video Encoding

- High-quality real-time encoding (I-, B-, and P-frames)
- Supports MPEG-2 (MP@ML, SP@ML) and MPEG-1
  - 525/60 (NTSC) up to 720x480 @ 30 fps
  - 625/50 (PAL) up to 720x576 @ 25 fps
- Variable and constant bit rate up to 15 Mbit/sec
- Programmable GOP lengths
- Adaptive field/frame (motion compensation type 8 DCT)
- Field/frame motion estimation
  - B-frame: ±296(H) x ±184(V)
  - P-frame: ±326(H) x ±202(V)
  - Half-pel accuracy
- 4:2:2 to 4:2:0 conversion
- Speckle noise reduction
- Sharpness control
- Recursive noise reduction
- Inverse telecine (3:2 pulldown)
- Scene change detection
- Adaptive quantization
- Supports elementary, program and transport streams
- VBI extraction

Video Decoding

- Supports MPEG-2 and MPEG-1
  - 525/60 (NTSC) up to 720x480 @ 30 fps
  - 625/50 (PAL) up to 720x576 @ 25 fps
- 144-tap horizontal up and down filter
- 64-tap vertical up and down filter
- Letterbox conversion from 16:9 to 4:3, 3:2 pulldown
- Supports elementary, Program and Transport streams
- Picture-in-picture (PIP)
- Closed captioning

Audio Encoding and Decoding

- MPEG-1 Layer II
- Sampling rates of 32 kHz, 44.1 kHz, and 48 kHz
- Compressed bit rates up to 448 kbit/sec
- Encode supports 16-bit samples
- Decode supports 16-, 18-, or 20-bit output (Dolby Class A)

On-Screen Display (OSD)

- Supports a variety of pixel formats
  - 8-bit color index
  - 32-bit ARGB 8:8:8:8
- Full screen or windowed
- Per-pixel alpha blend between OSD and video display
- Deflicker filter
- Hardware BITBLT acceleration

Interfaces

- Video input: 4:2:2 YUV CCIR-656
- Video output: 4:2:2 YUV CCIR-656
- Audio input: Stereo Sony I²S
- Audio output: Stereo Sony I²S or SP/DIF
- MPEG input and output supports one of the following
  - PCI DMA master or PCI slave
  - 8-bit parallel program data
  - 8-bit parallel SPI transport data
  - 1-bit serial transport data
- Two 64-Mbit SDRAMs for encode and decode
- Host interface supports one of the following
  - 32-bit, 33 MHz PCI
  - 8-bit microcontroller
- General-purpose input/output with 16 programmable pins

Package

- 452-ball PBGA

CONEXANT™

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