

# CL8830

## MPEG-2 Audio/Video Processor with RealSonic™ Audio

C-Cube Microsystems presents the CL8830 MPEG-2 A/V Processor, its 3rd generation single-chip MPEG-2 A/V decoder. The CL8830 delivers high-quality playback of all popular video disc formats, including Chaoji VCD, CVD, VCD2.0, and VCD1.1. In addition, the CL8830 significantly enriches the consumers' home theater and karaoke experience with its breakthrough RealSonic audio technology.

With the CL8830's high level of integration, OEM's will deliver affordable Chaoji VCD solutions providing the highest quality audio and video experience.

The CL8830 delivers an unparalleled set of features, including:"

- MPEG-2 A/V decoding at 2/3 and 1/2 D1 resolutions
- Variable bitrate (VBR) technology to ensure the highest quality video output
- An embedded 50 MIPS dedicated Audio DSP provides a rich audio feature set
- C-Cube's RealSonic Audio technology allows royalty-free DVD-quality home-theater audio and custom audio effects
- Basic Karaoke functions (mic echo, key control, stereo vocal cancel and voice detect)
- Professional Karaoke functions such as vocal harmony, vocal chorus, vocal scoring, vocal flange, vocal reverb, microphone treble and simulated stereo
- Home Theater Effects, including: WideSound™, RealSonic 3D audio, RealSonic multichannel outputs, RealSonic concert hall, RealSonic dynamic range compression and graphic equalizer
- Two stereo audio input channels allow full stereo multiple language support and full stereo Karaoke
- High-resolution lyrics for clear, crisp movie subtitles
- Lyrics scrolling and color change for Karaoke sing-alone
- Multiple high-resolution Lyrics channels to support multiple language subtitles
- Zoom and fade-in/fade-out functions for still and motion pictures
- Integrated SDRAM interface for compact, low-cost memory design
- ClearView™, DiscView™, and FlexView™ technologies
- Highest playback quality for all video disc formats including Chaoji VCD, CVD, VCD1.x, VCD2.0, CD-DA and CD-I



## AUDIO FEATURES

### ADVANCED AUDIO ENGINE

The CL8830 includes a dedicated 50 Mips audio engine and C-Cube's advanced RealSonic audio technology. RealSonic is C-Cube's proprietary technology that allows home-theater quality audio effects without any associated royalty. This technology allows OEM's to offer high-end DVD-quality home-theater audio and professional Karaoke functions at no extra cost.

### HOME THEATER AUDIO

The DVD-quality home-theater audio features include WideSound, RealSonic 3D audio, RealSonic multichannel outputs, RealSonic concert hall, RealSonic dynamic range compression, graphic equalizer and custom audio effects. Reverberation and echo sounds can be programmed to create the multiple live atmospheres that allow users to enjoy high quality movie theater surround sound and concert hall music. In addition, four-channel surround sound can be simulated with only two speaker outputs.

- **WideSound:** Creates wider sound field than the actual speaker position.
- **RealSonic 3D Audio:** Creates a movie hall surround sound effect from two speakers.
- **RealSonic Multi-Channel Outputs:** Creates four-channel output from stereo source material.
- **RealSonic Concert Hall:** Multiple listening environments can be simulated, such as concert hall, church, stadium and jazz club.
- **RealSonic Dynamic Range Compression:** Compresses the dynamic range of the output signal to increase the average output level without distortion.

- **Graphic Equalizer:** Adjusts the frequency band by raising or lowering the level of tone.
- **Custom Audio Effects:** Audio effects can be customized by configurable parameters.

### PROFESSIONAL KARAOKE FUNCTIONS

In addition to the basic Karaoke functions (mic echo, key control, stereo vocal cancel and voice detect), the CL8830 also provides appealing professional Karaoke functions such as:

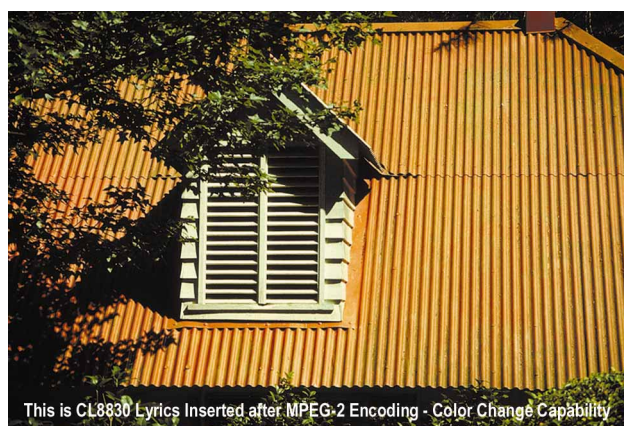
- **Vocal Harmony:** This function constructs additional "voices" that occur at a frequency-ratio shift away from the original microphone input. It can create up to three distinct voices that are mixed with the original signal to create a harmony effect.
- **Vocal Chorus:** This feature creates additional "singers". The Vocal Chorus adds 1/8 pitch and 1/4 pitch voices to the original vocal to create the effect of two or three people singing as accompanists.
- **Vocal Scoring:** This function is a built-in singing "judge" function that allows singers to compare themselves to each other or to improve their singing skills.
- **Vocal Reverb:** Reverb adds multiple decaying echo to microphones to provide concert hall effect for Karaoke.
- **Microphone Treble:** This function performs adjustable treble enhancement for the microphone input.
- **Simulated Stereo:** This feature adds phase information to mono audio and microphone signals to make them sound stereo-like.
- **Full Stereo Karaoke:** Due to two stereo audio inputs, full stereo Karaoke playback can be achieved. The Karaoke singer can be accompanied by full stereo music.

VCD Resolution: 352 x 240/NTSC; 352 x 288/PAL



VCD Picture is Blurry, Text is Difficult to Read

Chaoji VCD Resolution: 480 x 480/NTSC; 480 x 576/PAL



CL8830 Video and Lyrics are Crystal Clear  
CL8830 Supports Color-Change and Scrolling

## MPEG AUDIO DECODING

The CL8830 decodes Variable Bitrate (VBR) MPEG-2 audio streams. The bitrate per channel is 32 to 192 KBPS and the bitrate per stream is 64 to 384 KBPS. Sampling rates of 44.1 or 48 kHz are used for high quality audio.

## MULTIPLE LANGUAGE SUPPORT

Because the CL8830 has two stereo or four mono audio input channels, it can support full stereo multiple languages. This allows the user to hear and view the content in each language in full stereo audio.

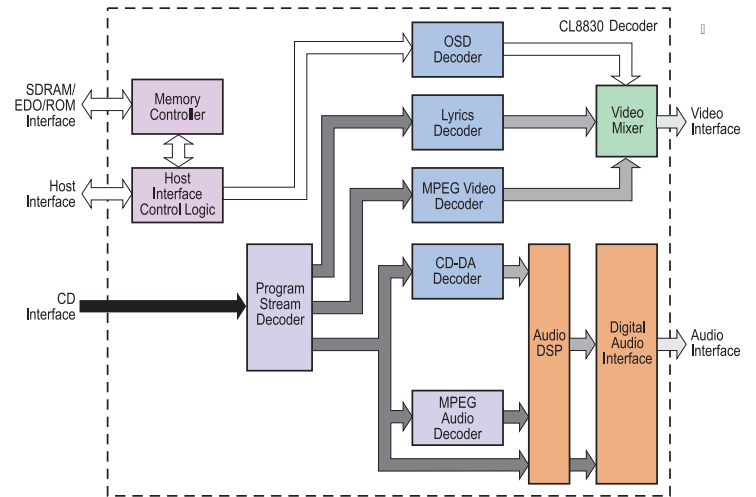
## VIDEO FEATURES

### HIGHEST PLAYBACK QUALITY OF ALL DISC FORMATS

C-Cube has leading edge technology and five years experience in China's VCD market. Because of this, the CL8830 is not only compatible with the Chaoji VCD, CVD, VCD 1.x, VCD 2.0, CD-DA and CD-I formats, but also provides highest audio and video quality during playback of these formats.

### MPEG VIDEO DECODING

The CL8830 supports both MPEG-1 and MPEG-2 video decoding to ensure backwards compatibility with VCD and still provide high-quality decoding of MPEG-2 encoded video streams. It also supports VBR MPEG-2 video stream for even higher video quality. It supports both 1/2 and 2/3 D1 picture resolution and frame aspect ratios of either 4:3 or 16:9.



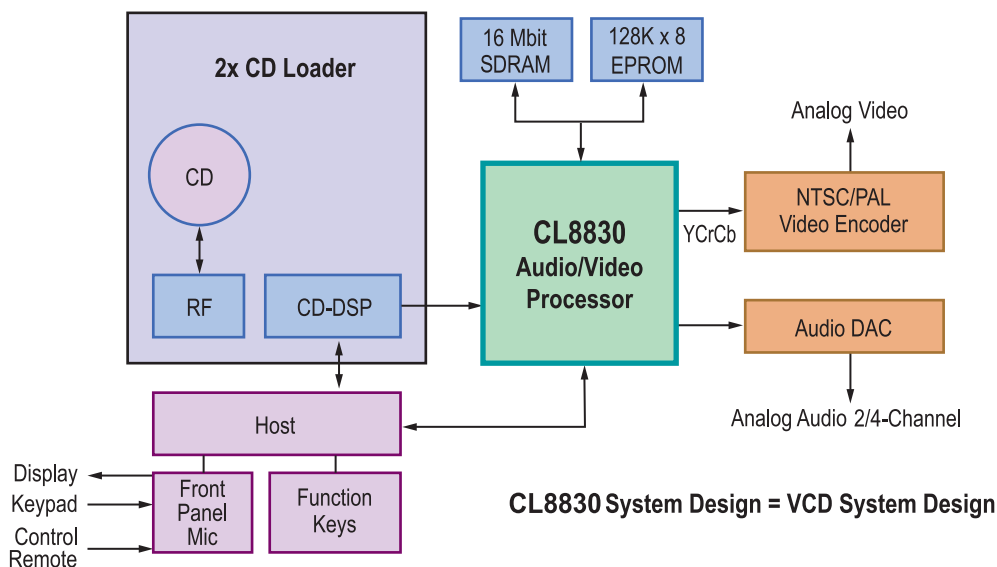
Dataflow through the CL8830

### CLEARVIEW

A unique engineering achievement, ClearView sets the standard for reliable, clear video. ClearView technology prevents tearing and blocking caused by dirty or flawed CDs. Header and picture errors are identified, classified and concealed. ClearView ensures popular CD formats can be played back flawlessly.

### DISCVIEW

DiscView provides VCD 2.0 PBC-type navigation for VCD 1.1 discs. It can be integrated into the machine's operation as a playback control option for quick scanning and selection of disc contents. DiscView allows advanced menu selection capability by providing a menu display of nine images from which different tracks or discs may be chosen.



CL8830 System Design = VCD System Design

CL8830 Player Block Diagram

## FLEXVIEW

This feature converts NTSC source material to PAL format to provide full-screen, correctly proportioned video. C-Cube's adaptive interpolation technology is used for smooth, raster-free scaling.

## GRAPHICS FEATURES

### HIGH-RESOLUTION LYRICS

Either CCIR-601 high-resolution overlay graphics or text data can be embedded in the Chaoji VCD bit stream for clear, crisp movie subtitles. Lyrics scrolling and color change are achieved. Four independent channels for Lyrics support multiple languages.

### BITMAPPED OSD

Integrated on-screen display (OSD) allows text and graphics to be overlaid on full-motion video anywhere on the screen. Four-, 16-, or 256-color on-screen display is available.

## PHYSICAL FEATURES

### SDRAM INTERFACE

The flexible memory configuration of the CL8830 supports 16 to 32 Mbits of SDRAM. This compact memory design allows both customization and cost reduction. The minimum required DRAM for full NTSC and PAL decoding is 16 Mbits.

### LOW COST SYSTEM DESIGN

The components needed to build a Chaoji VCD player components are readily available at low cost. The block diagram for the player is shown on the previous page.



## SIMPLE PROGRAMMING

The CL8830 provides an application programming interface (API) consisting of high-level commands that allow the host to monitor and control the input, decode, and output processes. This API is compatible with CVD-1 and CL8820.

## POWER AND PACKAGING

The CL8830 operates with a normal supply voltage of 3.3V, but can accept 5V inputs. It is packaged in a 208 pin Plastic Quad Flat Pack (PQFP).

## PRODUCT SPECIFICATIONS

### Video

Decoding Standards	MPEG-1, MPEG-2
Picture Resolution	NTSC: 480 x 480 PAL: 480 x 576; NTSC: 352 x 480, PAL: 352 x 576
Output Formats	NTSC, PAL
Compatibility	Chaoji VCD, CVD, VCD 1.x, 2.0, CD-DA, CD-I
Timing	Generates horizontal and vertical synchronization signals

### Graphics

On-Screen Display	4-, 16-, or 256-color bitmapped OSD
Overlay Graphics and Text	Full screen, multicolor; overlay displays for vocal text and still graphical images
Lyrics	CCIR-601 resolution, 4 graphics channels

### Audio

Audio DSP	50 MIPS dedicated Audio DSP
Decoding Standards	MPEG-1, MPEG-2 Layer I and II
Input Channels	2 stereo or 4 mono
Output Channels	4
Sample Rates	44.1 kHz, 48 kHz

### System

Compressed Data Input	CD interface
Compressed VBR	Up to 2.88 Mbits/s
DRAM	16/32 Mbits SDRAM or 20 Mbits SDRAM/EDO DRAM
ROM	4 Mbits EPROM

### Physical

Input Voltage	3.3V TTL 5% (tolerates 5V input)
Packaging	208-pin PQFP