

## FEATURES

- Fully-compatible with the 1.3 GB Double Density CD-ROM/-R/-RW specification
- Up to 16x write speeds and 50x read speeds
- Integrates CD-ROM decoder, CD-ROM encoder, CIRC encoder, EFM modulator, ATIP decoder, buffer manager, and interface to SCSI protocol ICs
- Firmware backward compatible with previous generations of CD-RW encoder/decoder
- High-performance ATAPI interface supports synchronous DMA/33 protocol
- Automatic power-down interfaces when idle
- Built-in clock synthesizer
- Available in 128-pin LQFP package

### ■ CD-R/CD-RW encoder

- Supports all write methods:
  - Disc at once
  - Track at once
  - Packet recording
  - Multi-session at once
- Highly automated CD-R/CD-RW formatter eliminates the sector-by-sector intervention by the microcontroller
- Supports CD-RW logical erase

## Double Density CD-ROM/-R/-RW Encoder/Decoder

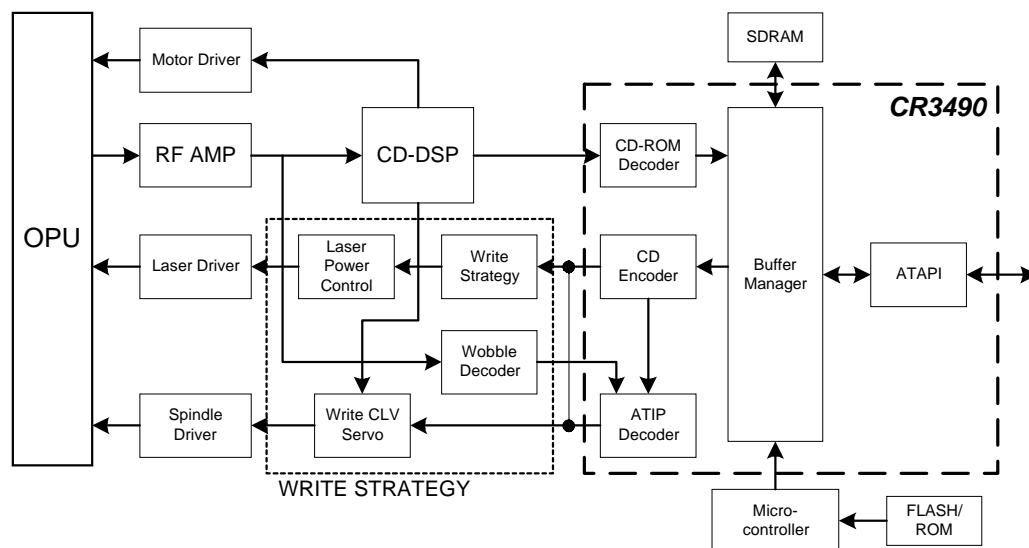
- Supports up to 16x encoding
- Supports subcode R-W encode
- Integrated CIRC encoder
- Integrated EFM modulation circuitry
- Integrated ATIP decoder with target ATIP search function
- Provides timing for laser power on/off control

### ■ CD-ROM decoder

- Supports Sony-Philips® CD-ROM, CD-I, and CD-Digital Audio (CD-DA™) formats
- Supports various compact disc DSP (digital signal processor) controllers
- Read speeds up to 50x
- Supports programmable pseudo-sync-mark insertion for CD-ROM sector synchronization
- Supports automatic target sector header search for CD-ROM

(cont. [page 2](#))

## System Block Diagram



**FEATURES** (cont.)**■ CD-ROM decoder (cont.)**

- Supports CD-Text mode format
- Sector header validity check is done by hardware during data transfers
- Realtime CD-ROM layered ECC error correction with programmable number of sets of P-word and Q-word corrections per sector (up to 64 total)
- Supports realtime subcode R-W correction in CD-DA (digital audio) mode
- Automated CD-R packet disc read Method-1 and Method-2

**■ DAC interface**

- Audio Data Buffering (ADB) supports electronic shock proof CD-DA audio play mode
- Supports buffer streaming during buffer-to-DAC data transfer
- Supports various DACs

**■ ATAPI host interface**

- Fully compatible with the ATAPI specification SFF-8020
- True realtime hardware/software ATAPI compatibility
- Hardware implementation of ATAPI packet command ATAPI reset command
- Automated protocol control on block data transfer for ATAPI read/write commands
- Supports Synchronous DMA/33 data transfer protocol with data rates up to 33.3 Mbytes/sec.
- Direct interface to ATAPI bus with 4-mA or 12-mA drivers
- Supports any host speed with programmable and auto wait-state generation
- Supports fast ATA transfer speed; up to PIO mode 4, single-word DMA mode 2, and multi-word DMA mode 2
- Provision to daisy-chain two ATA or ATAPI embedded drives

**■ Buffer manager**

- Direct addressing of up to 8 Mbytes of SDRAM
- Supports 8-bit SDRAMs
- Dual-port circular buffer control with access-priority resolver
- Supports variable buffer segmentation
- Supports streaming mode: hardware automation of concurrent host and disc transfer from different buffer segments, with a pacing mechanism to prevent buffer overrun and underrun conditions
- Programmable timing control for SDRAM

**■ Microcontroller interface**

- Supports high-speed Intel®-type microcontrollers
- Supports non-multiplexed address and data buses
- Interrupt- or polled-microcontroller interface
- Supports Intel®-type byte ordering for word-wide microcontroller instructions
- Supports direct microcontroller access to buffer memory

**■ SCSI interface**

- Supports data transfer to/from SCSI protocol devices, such as Symbios Logic® 53CF94/96-2 and 53CF92A Fast SCSI controllers

**■ Absolute maximum ratings**

- Ambient temperature under bias: 0°C to 70°C
  - Storage temperature: -65°C to 150°C
  - Voltage on any pin with respect to ground: (GND -0.3 V) to (V<sub>CC</sub> +0.3 V)
  - Power dissipation: 0.40 W
  - Power supply voltage: 3.0 to 3.6V
  - Core power supply voltage: 2.25 to 2.75V
-

## OVERVIEW

The CL-CR3490 is the first encoder/decoder chip to support the Double Density CD-ROM/-R/-RW standard, increasing the capacity of a 120mm CD to 1.3 Gbyte. This high-performance, highly integrated ATAPI interface device provides drive manufacturers the ability to design and deliver a high-performance CD-R/CD-RW (CD-Recordable/CD-ReWritable) drive for this market. The CL-CR3490 supports up to 16x record/50x read speeds and integrates a CD-ROM decoder, CIRC encoder, EFM modulation, ATIP decoder, buffer manager, and ATAPI interface logic.

The CL-CR3490 allows customers to preserve all CD-R/CD-RW encode/decode firmware and electronics due to backward compatibility with previous Cirrus Logic devices. This feature becomes more important as write speed requirements increase and drive development cycles shorten.

All write methods are supported by the CL-CR3490: disc-at-once, track-at-once, packet recording, and multi-session-at-once. The device incorporates the most comprehensive error correction available in the industry, using realtime CD-ROM-layered ECC error correction with a programmable number of P- and Q-word corrections per sector (up to 64). The CL-CR3490 also supports realtime subcode R-W correction in CD-DA mode.

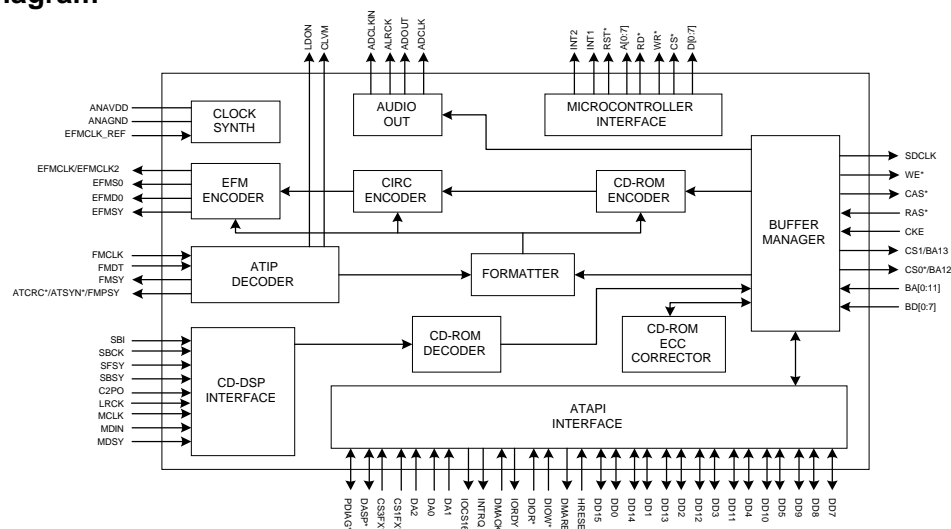
The DSP interface of the CL-CR3490 supports various CD-ROM DSPs from numerous manufacturers. The DSP interface includes three types of interface signals: main data channel, subcode channel, and serial DSP programming signals.

The integrated CD-R/-RW formatter is a built-in control processor that executes formatter instructions stored in the buffer memory, controls the CD-ROM encoder, and specifies how each block is generated/encoded through an entire recording operation. The built-in high-performance buffer manager controls the flow of data between the external DRAM data buffer and all other internal blocks.

In addition, the CL-CR3490 supports streaming mode, or the hardware automation of concurrent host and disc transfers from the same buffer segment. These features ease firmware programming and decrease microcontroller intervention.

The highly automated and optimized ATAPI interface is designed to comply with the ATAPI specification. The ATAPI Command and Control Block registers contained in the CL-CR3490 register set allow both the host and the local microcontroller access.

## Chip Block Diagram





## Direct Sales Offices

### Domestic

#### WESTERN AREA

Fremont  
TEL: 510/623-8300  
FAX: 510/252-6020

Los Angeles  
TEL: 310/826-9382  
FAX: 310/826-9532

Newbury Park  
TEL: 805/375-9995  
FAX: 805/375-9952

Portland, OR  
TEL: 503/620-5547  
FAX: 503/620-5665

#### CENTRAL AREA

Austin, TX  
TEL: 512/338-1831  
FAX: 512/338-0196

Houston, TX  
TEL: 281/477-7119  
FAX: 281/477-7116

Chicago, IL  
TEL: 847/884-6750  
FAX: 847/884-6795

#### EASTERN AREA

Boca Raton, FL  
TEL: 561/395-1613  
FAX: 561/395-1373

Columbia, MD  
TEL: 410/740-5654  
FAX: 410/740-6961

Wake Forest, NC  
TEL: 919/528-6877  
FAX: 919/528-6878

Burlington, MA  
TEL: 781/229-5835  
FAX: 781/229-5888

### International

#### FRANCE

Paris  
TEL: 33/1-48-12-2812  
FAX: 33/1-48-12-2810

#### GERMANY

Herrsching  
TEL: 49/81-52-92460  
FAX: 49/81-52-924699

#### JAPAN

Tokyo  
TEL: 81/3-3340-9111  
FAX: 81/3-3340-9120

#### KOREA

Seoul  
TEL: 82/2-585-8561  
FAX: 82/2-588-8565

#### SINGAPORE

TEL: 65/743-4111  
FAX: 65/742-4111

#### TAIWAN

Taipei  
TEL: 886/2-2718-4533  
FAX: 886/2-2718-4526

#### UNITED KINGDOM

Bucks, England  
TEL: 44/01628-472211  
FAX: 44/01628-486114

---

## Cirrus Logic...where Analog meets Digital™

Cirrus Logic Inc. is a premier supplier of precision linear circuits and advanced mixed-signal chip solutions. The company's products, sold under its own name and the Crystal® product brand, enable system-level applications in mass storage, audio, and precision data conversion.

With more than 900 patents (issued and pending), Cirrus Logic's inventions are substantive, and the company continues to expand its rich intellectual property portfolio through major R&D investments. Nearly half of the company's patents involve mixed-signal technology, which is key to innovating highly integrated system-on-a-chip solutions. Over the past decade, Cirrus Logic has achieved nearly 70 industry firsts with its product introductions. Many of these innovations have set new industry standards within their respective markets.

To learn how your Cirrus Logic can add high value and differentiation to your products, contact one of our system and applications specialists today.

Copyright © 2000 Cirrus Logic, Inc. All rights reserved. Printed in USA.

---

*Preliminary* product information describes products which are in production, but for which full characterization data is not yet available. Cirrus Logic, Inc. has made best efforts to ensure that the information contained in this document is accurate and reliable. However, the information is subject to change without notice and is provided "AS IS" without warranty of any kind (express or implied). No responsibility is assumed by Cirrus Logic, Inc. for the use of this information, nor for infringements of patents or other rights of third parties. This document is the property of Cirrus Logic, Inc. and implies no license under patents, copyrights, trademarks, or trade secrets. Furthermore, no part of this publication may be used as a basis for manufacture or sale of any items without the prior written consent of Cirrus Logic, Inc. The names of products of Cirrus Logic, Inc. or other vendors and suppliers appearing in this document may be trademarks or service marks of their respective owners, which may be registered in some jurisdictions. A list of Cirrus Logic, Inc. trademarks and service marks can be found at <http://www.cirrus.com>.

---

**Cirrus Logic, Inc.**  
4210 S. Industrial Drive, Austin, TX 78744  
TEL: 512/445-7222 FAX: 512/445-7581

**Publications Ordering:** 800/359-6414 (USA) or 510/249-4200  
**Worldwide Web:** <http://www.cirrus.com>

363490-XX2