CL-CR3700

Preliminary Product Bulletin

FEATURES

- **General**
  - — Integrates all required components for a complete ATAPI DVD-ROM electronics solution:
    - RF amp
    - Data channel
    - Servo control processor
    - DVD ECC (error correction code)
    - CSS (content scramble system)
    - ATAPI decoder
  - — Direct MPEG-2 decoder interface for DVD player applications
  - — High-performance controller supports DVD disc speeds up to 4.5×
  - — Supports Ultra DMA: capable of synchronous DMA data transfer rates up to 33.3 Mbytes/sec.
  - — Firmware compatible with all Cirrus Logic CD-ROM and CD-R/RW devices
  - — Low-power, highly efficient 0.35-micron CMOS technology
  - — 208-pin VQFP package
- **RF Amp**
  - — Provides laser power control
  - — Gain control closed in the digital domain
  - — Generates focus error and tracking signal

(cont.)

Integrated ATAPI DVD Drive Manager

OVERVIEW

The CL-CR3700 is Cirrus Logic's high-integration, high-performance ATAPI DVD drive manager. It integrates all required components for a DVD-ROM drive and can be used in a DVD player. The CL-CR3700 includes RF amp, servo control processor, data channel, DVD ECC, CSS, CD-ROM decoder, and ATAPI interface logic.

The CL-CR3700 can be configured with an audio DAC (digital-to-analog converter), external buffer memory (8- or 16-bit DRAM), a local microcontroller with its RAM and ROM, and power drivers to create a complete DVD-ROM electronics solution. It has an integrated MPEG-2 interface and can be efficiently designed into a DVD player.

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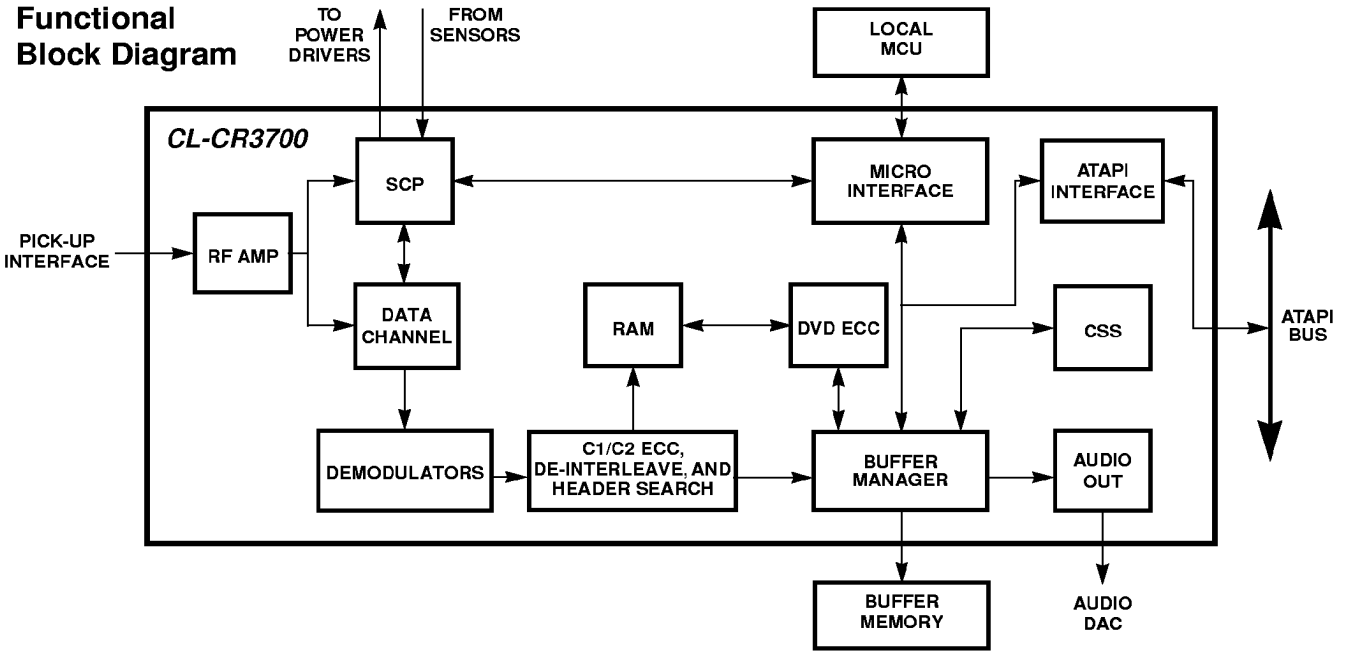
Functional Block Diagram



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FEATURES (cont.)

- Provides RF signal for the data channel
- Bypassable for external RF amp applications

■ **Data Channel**
- Digital PLL provides flexible control of center frequency to support improved access times
- Channel quality provided for parametric calibration
- Channel data rates up to 116 Mbits/sec.
- Flexible and error-tolerant channel sync mark windowing

■ **SCP (Servo Control Processor)**
- Includes a servo control processor for focus, tracking, sled, and spindle servo loops
- Significantly faster capture for focus and tracking
- Effective in a wide range of parameter variations
- Superior response to defects, shock, and vibration
- Provides Back-EMF sensing/Hall sensor and commutation logic for spindle motor
- Supports both CLV (constant linear velocity) and CAV (constant angular velocity) modes

■ **ECC**
- Realtime DVD ECC error correction
- Realtime CD-ROM layered ECC error correction with programmable number of sets of P- and Q-word corrections per sector (up to 64 total)
- C1/C2 ECC and de-interleaving for CD-ROM/CD-DA
- Realtime subcode error correction in CD-DA (compact disc digital audio) mode

■ **Decoder**
- Supports hardware streaming operation
- DVD navigation support
- Supports ADB (audio data buffering)
- Automatic target sector header search
- Hardware sector header validity check
- Supports high-speed Intel®- and Motorola®-type microcontrollers
- Supports nonmultiplexed and multiplexed address and data buses

■ **ATAPI Host Interface**
- True realtime hardware/software ATAPI compatibility
- Supports Ultra DMA: capable of synchronous DMA data rates up to 33.3 Mbytes/sec.
- Supports ATA PIO modes 3 and 4 transfers without IOCHRDY
- Supports DMA modes 1 and 2
- Hardware implementation of:
  - ATAPI packet command
  - ATAPI reset command
- Direct interface to ATAPI bus with programmable 4- or 12-mA drivers

OVERVIEW (cont.)

The CL-CR3700 supports DVD disc speeds up to 4.5× and Ultra DMA host speeds up to 33.3 Mbytes/sec.

The RF signal is oversampled by a high-speed ADC (analog-to-digital converter). The timing loop is closed in the digital domain with variable decimation and interpolation used to provide the output samples to the data recovery logic. A channel-quality logic circuit is provided to allow parametric calibration.

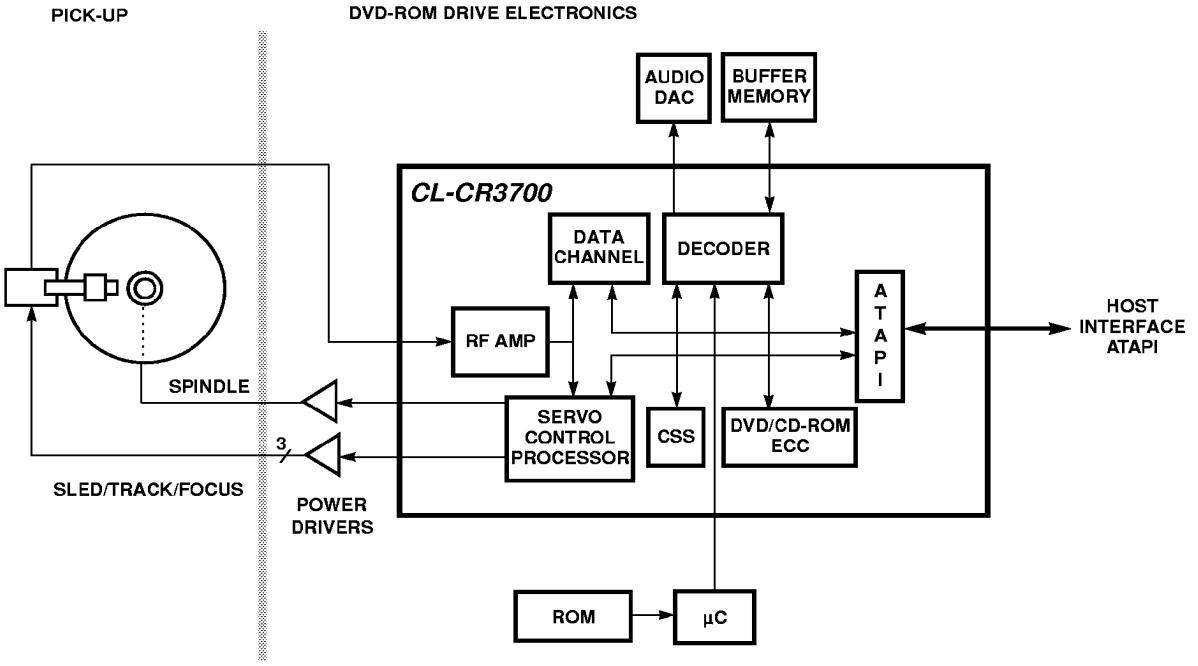
The CL-CR3700 servo control processor implements the focus, tracking, sled, and spindle servo loops. An ADC is provided to convert the focus and tracking error signal. The outputs to the power drivers are linear DACs.

The CL-CR3700 supports realtime DVD ECC, CD-ROM C1/C2, and layered ECC correction, which is programmable for up to 64 P- and Q-word corrections per sector. It also supports subcode R/W correction in CD-DA (compact disc digital audio) mode.

The buffer manager controls the flow of data from the data channel, through the ECC, and to either the host interface or the serial audio channel. Data is stored and retrieved in the external buffer memory using interleaved access cycles. The buffer memory is implemented with DRAM (dynamic RAM) devices. The buffer manager is programmable to provide all of the necessary address and control signals for RAM devices of varying access times and memory configurations. Up to 8 Mbytes of DRAM can be directly addressed by the CL-CR3700.

The ATAPI host interface is designed for compliance with the ATAPI specification. The ATAPI Command and Control Block registers are contained in the CL-CR3700 register set, which allows both host and local microcontroller access. The CL-CR3700 supports the ATAPI packet command and reset command protocols in hardware without microcontroller intervention. The host interface logic includes integrated 4- or 12-mA switchable drivers for the ATAPI interface data signals.

DVD-ROM SYSTEM BLOCK DIAGRAM



DVD PLAYER SYSTEM BLOCK DIAGRAM