

FEATURES

■ General

- Integrates all required components for a complete AVI or ATAPI interface DVD drive (front-end) electronics solution:
 - RF amp
 - Data channel
 - Servo control processor
 - DVD ECC (error correction code)
 - CSS (content scramble system)
 - ATAPI decoder
- Direct Audio/Video Interface for DVD player applications
- ATAPI interface for slim-line DVD-ROM solutions
- High-performance controller supports DVD disc speeds up to 8×
- Partial Response Maximum Likelihood (PRML) data channel.
- Servo Control Processor (SCP) on board
- DVD navigation support
- Firmware compatible with all Cirrus Logic CD-ROM and CD-R/RW devices
- 208-pin LQFP package

■ RF Amp

- Provides laser power control
- Gain control closed in the digital domain

(cont.)

Integrated AVI / ATAPI DVD Drive Manager

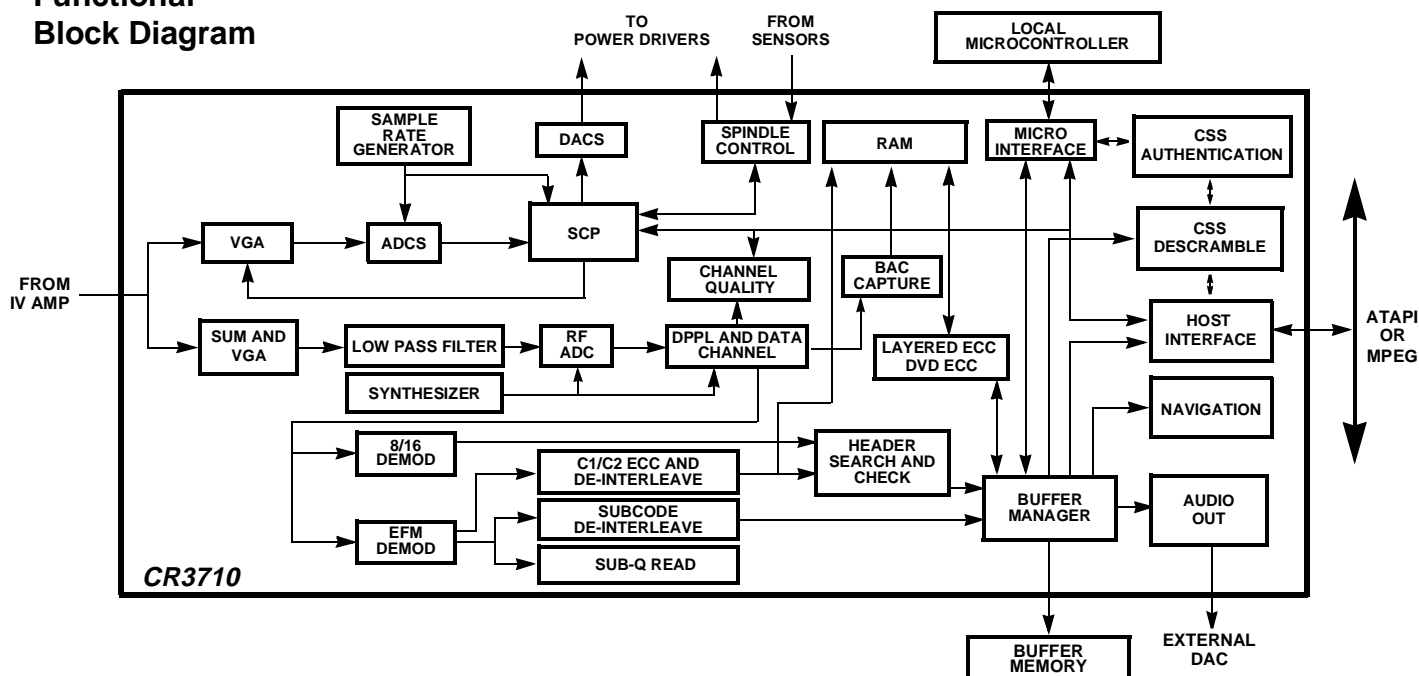
OVERVIEW

The CR3710 is Cirrus Logic's high-integration, high-performance ATAPI DVD drive manager. It integrates all required components for a DVD loader for DVD players and slim-line DVD-ROM drives. The CR3710 includes RF amp, servo control processor, data channel, DVD ECC, CSS authorization, CD-ROM decoder, and AVI and ATAPI interfaces.

The CR3710 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.

(cont.)

Functional Block Diagram



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FEATURES (cont.)

- Generates focus error and tracking signal
- Provides RF (radio frequency) 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 78 Mbytes/sec.
- Flexible and error-tolerant channel sync mark windowing

■ **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-word and Q-word

corrections per sector (up to 64 total)

- C1/C2 ECC and de-interleaving
- 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

■ **Host Interfaces**

- AVI interface either serial or 8-bit parallel supporting Type-A and Type-B MPEG interfaces
- 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
- Hardware implementation of:
 - ATAPI packet command
 - ATAPI reset command

OVERVIEW (cont.)

The CR3710 supports DVD disc speeds up to 8× 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 CR3710 data channel supports partial response maximum likelihood (PRML) data acquisition providing state-of-the-art data recognition in a noisy environment coming from the pick-up head.

The CR3710 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.

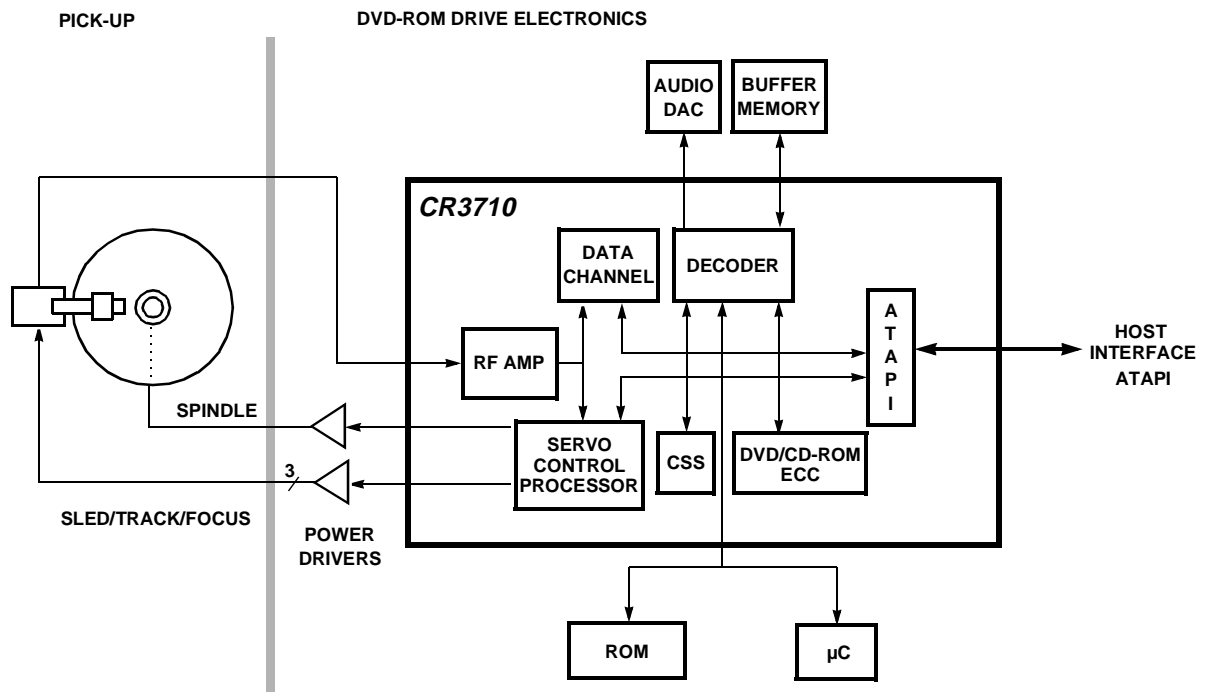
The CR3710 supports realtime DVD ECC, CD-ROM C1/C2, and layered ECC correction, which is programmable for up to 64 P/Q-word corrections per

sector. It also supports subcode R-W correction in the 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/retrieved in the external buffer memory using interleaved access cycles. The buffer memory is implemented with dynamic RAM devices. Up to 8 Mbytes of DRAM can be directly addressed by the CR3710.

The host interface is designed with AVI and ATAPI interfaces. The AVI interface supports either serial or 8-bit parallel streams for compliance with Type-A or Type-B MPEG interfaces. The ATAPI Command and Control Block registers are contained in the CR3710 register set, which allows both host and local microcontroller access. Either interface is enabled by setting a bit in a register.

DVD-ROM SYSTEM BLOCK DIAGRAM



DVD PLAYER SYSTEM BLOCK DIAGRAM

