



OTI-9790

ATAPI/USB 32X READ/8X Write Controller with Integrated CD-DSP, CD Servo, Wobble Servo, and Write Strategy

Oak Technology's OTI-9790 provides the highest level of integration of any CD-R/RW controller of its kind, with 32X decoder and 8X encoder performance. In addition to a highly automated block decoder/encoder, the OTI-9790 integrates CD-DSP, CD servo, wobble servo, dynamic write strategy, and audio DAC circuits that offer the best performance in the industry.

VARIETY OF INTEGRATED CONTROLS

The block decoder and CD encoder of the OTI-9790 are highly automated, greatly reducing the complexity and size of the firmware, as well as the required firmware storage and allowing the use of an inexpensive microcontroller. The OTI-9790 also allows the microcontroller direct access to DRAM, eliminating the need and cost of additional SRAM.

The CD-DSP and CD servo of the OTI-9790 use advanced digital signal processing techniques to minimize the analog circuitry required. This approach provides greater immunity to system noise and offers increased flexibility. The advanced architecture results in reduced error rates, greater seek accuracy and improved seek access time, particularly for CD-R/RW media.

The CD-DSP block of the OTI-9790 converts the analog RF data received from the pre-amplifier into digital data. The data is then EFM decoded and C1/C2 error corrected. The CD-DSP utilizes an advanced data slicing technique and digital asymmetry control loop, offering more programmability for frequency and gain. The digital PLL for data/clock offers fast response and recovery from defects.

The CD servo block of the OTI-9790 is responsible for spindle motor speed control, optical pickup, focus, tracking and sled movement. All servo loops are digital with integrated ADC and DAC I/O. Digital filter, gain, and constant parameters are implemented with high precision. Advanced track counting enables a jump of an exact number of tracks up to 2047, substantially reducing the seek time. Stable one-track re-seek ensures no buffer underflow and improves buffer effectiveness for host transfer and nX-to-1X playback. These and other advanced tracking and focus enhancements help keep drive head centered and focused on the track, resulting in a much faster seek time, particularly for CD-R/RW media.

The wobble servo of the OTI-9790 supports speeds up to 12X, allowing for much faster open session reading. The write strategy block offers a high degree of programmability, allowing many different implementations of CD-R and CD-RW strategies. The dynamic write strategy scheme implemented on the OTI-9790 allows for automatic fine adjustments for the write pulses, ensuring a much higher degree of interchangeability.

Key Features

- Highly automated
- Microcontroller direct access to DRAM
- Supports native PIO mode 4
- Supports DMA mode 2
- Supports UDMA -33
- Supports SCSI passthrough mode

Improved disk readability

- Lower C1/C2 error rate
- Improved eccentricity tolerance
- Improved focus
- Wobble tolerance

Improved seek performance

- Highly accurate 2047 track short seek
- Programmable velocity table
- Fast long seek with center position servo
- Accurate one-track re-seek
- PAM sled control for stiction

Advanced low power process

- Low power 0.35mm, 3.3V process
- 5V tolerant I/O
- ATAPI compliant I/O levels
- Enhanced power-down modes
- Single crystal operation
- 208-pin LQFP package

Highly integrated CD-R/RW controller

- ATAPI/USB 32X block decoder
- 8X CD encoder
- 32X CD-DSP
- CD servo
- 12X wobble servo
- Dynamic write strategy
- Audio DAC

