UNIVERSITY OF MINNESOTA
Driven to Discover℠

Cyclic Codes Error Pattern Correction Increases Hard Disk Storage Capacity

Technology ID
z07095

Learn more

IP Status: Issued US Patent; **Application #:** 96148132

Inter-Symbol Interference Increases Hard Disk Errors and Decreases Storage Capacity

Computer hard disk errors decrease storage capacity. Error detection and correction mechanisms in these hard drives are used to ensure accurate reads of the recorded sequences. The most common detection method is the single parity bit check, which utilizes the parity (even or odd) of a sequence. However, the dominant storage media, so-called perpendicular media, is prone to inter-symbol interference (ISI), which increases error rates in the read channel and decreases storage capacity.

MN-IP Try and Buy

This technology is available via a standard negotiated license agreement. Please contact us for specific details.

Error Pattern Correcting Cyclic Codes Better than Reed-Solomon

Cyclic codes generate and apply high-rate, error-pattern correcting codes to correct single instances of targeted error patterns in code words and to further correct a significant portion of multiple instances of targeted error patterns with the least redundancy. This process results in more than a 0.6dB SNR gain compared with the existing Reed-Solomon code read channel method, has low computational demand and approaches theoretical limits of error correction.

Hard Disk Storage Capacity Increased with Cyclic Codes

Error pattern correcting cyclic codes increase the hard disk storage capacity by 10 to 20% with no increase in cost or physical modification of the magnetic elements of a disk drive. The technology achieves these results by implementing an algorithm that improves the recovery from errors that result from the increase in the density of data storage on a hard drive. Thus, disk manufacturers may store data more densely on a disk drive or alternatively decrease the size of existing drives.

FEATURES AND BENEFITS OF ERROR PATTERN CORRECTION FOR CYCLIC CODES:

- Approaches theoretical limits of error correction
- Increases storage capacity of hard disk by 10-20% with no physical modification of the magnetic elements of a disk drive
- Greater than 0.6dB SNR ratio gain compared to the traditional Reed-Solomon code read channel method
- Low computational demand