SiliconMotion

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FerriSSD®
Quick Reference

FerriSSD®
BGA Solid-State Drive

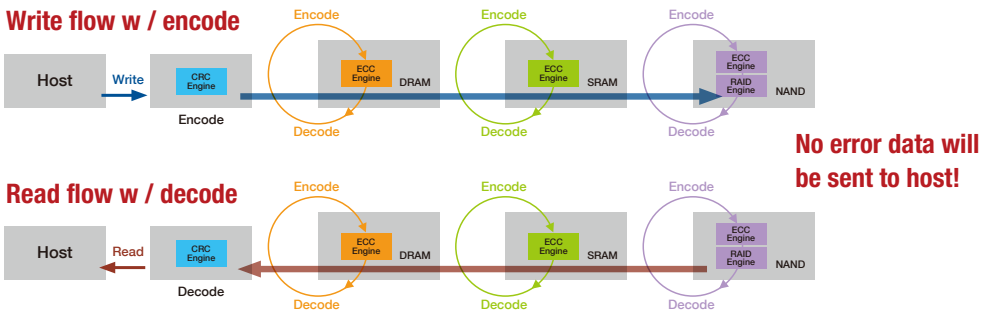
The FerriSSD® is designed optimally for a wide range of embedded applications requiring faster access speed, small flexible form factor and reliable PCIe NVMe/SATA/PATA storage. By combining industry proven controller technology, NAND flash and passive components into a small single BGA package, FerriSSD® simplifies design efforts, reduces time-to-market while protecting from NAND technology migration concerns.

The FerriSSD® family consists of the latest SM689 PCIe NVMe, SM619 SATA and legacy SM601 PATA series featuring high throughput transfer rate with embedded DRAM to enhance data storage efficiency and high random read/write IOPS. The 4th generation FerriSSD leveraging Silicon Motion's most advanced technologies, including IntelligentScan, DataRefresh, high bandwidth LDPC ECC engine with SMI group RAID, and End-to-end data path protection to provide unsurpassed data integrity in a non-volatile storage device. All FerriSSD® series support 3D SLCmode, MLCmode, and TLCmode NAND flash options.

Key Features

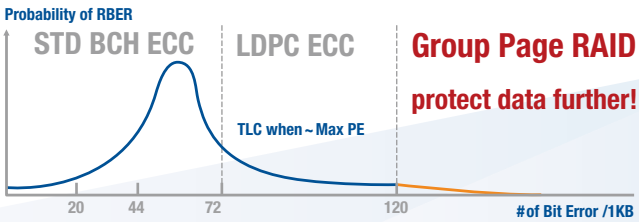
End to End Data Path Protection

SMI's FerriSSDs incorporate full data error detection with recovery engines to provide enhanced data integrity throughout the entire Host-to-NAND-to-Host data path. The FerriSSD® data recovery algorithm can effectively detect any error in the SSD data path, including hardware (i.e. ASIC) errors, firmware errors and memory errors arising in SRAM, DRAM or NAND.



NANDXtend™ ECC Engine

Conventional SSDs employ standard BCH and RS ECC (error correction coding) engines for initiate first-level correction using NAND shift-read-retries. In addition to this first-level error correction, FerriSSDs also implement a highly efficient second-level correction scheme using an LDPC (low-density parity check) code and a Group page RAID algorithm (a highly efficient redundant backup) to reduce potential dPPM at customer site while extending the service life of SSD.



Key Features

IntelligentScan and DataRefresh to Enhance Data Integrity

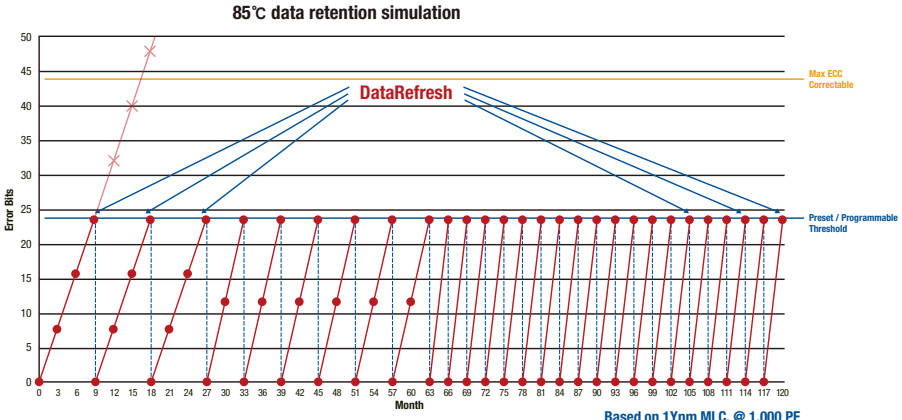
SMI's proprietary IntelligentScan function will activate automatically to scan recharge, repair or retire the cell block (DataRefresh) according to the host behavior and working environment (eg. ambient temperature). As a result of the combination of IntelligentScan and DataRefresh, FerriSSD® can effective prolong its service life much beyond typical NAND specifications.

Thermo impact on NAND Data Retention

Temp	SLC @ max PE	MLC @ max PE
40	75.58 Mo	12 Mo
55	12 Mo	1.88 Mo
70	2.14 Mo	0.34 Mo
85	0.45 Mo	0.07 Mo

Based on Arrhenius Equation

Higher ambient temp to increase Scan frequency



Based on 1Ynm MLC, @ 1,000 PE

IntelligentScan/DataRefresh to proactively extend Data Retention beyond the typical NAND flash limitation

Not to scale, for illustration purpose

Why FerriSSD®

Easy to use

- Plug & Play only requires format/fdisk prior to use
- Small footprint for space-limited design

Lower total cost of ownership

- Rugged & Reliable (no moving parts)
- Eliminate requalification cost from NAND generation change
- Cost saving with low density FerriSSD, HDD are typically > 160GB capacity

Eliminate down time

- Support S.M.A.R.T. and advanced SSD Telemetry logging features
- IntelligentScan with DataRefresh for Data integrity enhancement
- Full End-to-End data path protection with recovery algorithms
- SMI's 4th generation LDPC ECC engine with Group Page RAID
- Remote firmware update available via secured digital signature

Specifications

Form Factor	20mm x 16mm BGA
Green Product	RoHs compliant / Halogen free
Temperature Support	Commercial Temp (0°C to + 70°C) Industrial Temp (-40°C to + 85°C)

Available Density

3D SLCmode	4~80GB*
3D MLCmode	8~160GB**
3D TLCmode	16~256GB***

**160GB in Q3'2018*
***320GB in Q3'2018*
****512GB in Q3'2018*