

FerriSSD with DefendMax™: Secure and Reliable Boot Drive for Rugged Applications

Ferri-SSD®

Industries such as industrial automation, transportation, oil and gas, mining, public safety, energy, construction, and agriculture require robust storage solutions for their rugged applications. The market for these demanding applications is expanding due to several factors: the increasing need for durable and reliable devices in harsh environments, advancements in biometric authentication and communication technologies, and the growing trend of automation and digitalization in manufacturing and logistics.

Super Tough, Agile and Resilient Storage

The computing systems at the heart of any rugged application must handle a multitude of challenges that demand robust solutions. System requirements include stringent security measures such as encryption and secure boot processes to resist cybersecurity threats. These combine with practical demands such as the ability to withstand harsh conditions, shock, and vibration BGA SSDs provide a reliable, fast boot drive with inherent robustness, shock resistance, low weight, and low power demand. Also soundless, and with a minimal thermal footprint, they have ideal qualities for demanding applications. They are found in diverse types of equipment, from ruggedized computers and portable communication devices designed to withstand harsh conditions, to systems installed in vehicles where quick and reliable access to needed information, and navigation data can be critical (Image 1).



Image 1: FerriSSD is the perfect storage solution for rugged applications in both embedded and portable systems.

Over and above these qualities, Silicon Motion's FerriSSD drives with DefendMax™ protection give procurement agencies as well as users in the field ultimate confidence in their systems.

DefendMax™ encompasses intelligent protection, developed by Silicon Motion and proven in applications that demand high system integrity. These include IntelligentGuard™ to block cyber attacks, IntelligentShield™ that provides protection against power disruptions, and IntelligentThermal™ temperature monitoring and cooling.

In addition, IntelligentScan™ implements proactive self-scan with data-refresh for data preservation and data retention handling (to extend the SSD ability to hold data throughout the device life), and IntelligentCache™ provides a flush cache capability that enables burst write for handling applications that may require emergency data recording.

The DefendMax™ technologies combine with Silicon Motion's high-bandwidth LDPC ECC engine with SMI group RAID, and end-to-end data path protection, which is common to all FerriSSD drives, to provide unsurpassed data integrity in a robust BGA non-volatile storage device. All FerriSSD® series support 3D SLCmode and TLCmode NAND flash options.

Repel Malicious Attacks

DefendMax's IntelligentGuard™ technology prevents provides enhanced authentication and protection of the FerriSSD firmware to prevent cyber-attacks and thus ensure robust data protection and uncompromised functionality. IntelligentGuard's robust security features include data encryption with authenticated firmware protection (Figure 1).

Protect against Power Outage

DefendMax™ includes FerriSSD IntelligentShield™ protection against data loss caused by power outages. IntelligentShield checks for instability in the power supply and acts quickly to store any data in transit into a designated safe area. When data is most vulnerable, such as during write operations, remapping or wear levelling, cache exchanges, or when updating or synchronizing metadata, IntelligentShield prevents data loss to ensure FerriSSDs remain consistent, reliable, and incorruptible.

Perform Consistently over Temperature

IntelligentThermal™ monitors the drive's temperature and quickly activates cooling to prevent overheating. Proper temperature control extends the lifetime of the SSD, preserves the integrity of stored data, and sustains optimum drive performance with consistent access times, data transfer speeds, and minimal latency. IntelligentThermal can support either host-controlled thermal management (HCTM) or drive-controlled thermal management (DCTM) to control temperature and enable the SSD to operate reliably even in challenging conditions with high ambient temperatures.

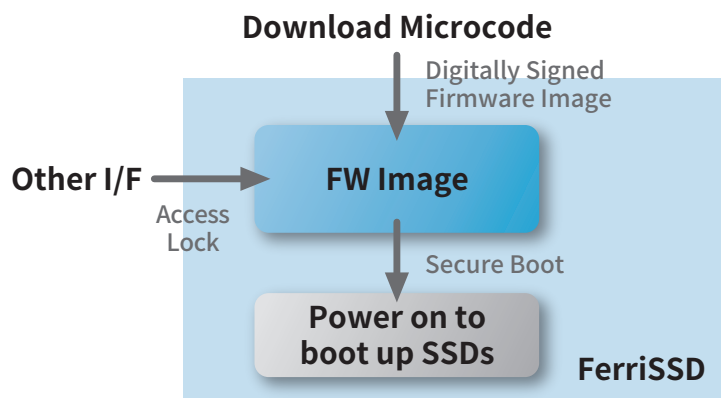


Figure 1: IntelligentGuard™ technology maintains boot security by enhancing authentication and protection mechanisms of the SSD's firmware.

Continuous Disk Maintenance

IntelligentScan™ with DataRefresh performs automatic scanning and repairs, ensuring that all data stored to the disk, at all times and at all locations including secure areas, can be read and written correctly. It increases the duration of data storage and extends the lifespan of the SSD (Figure 2).

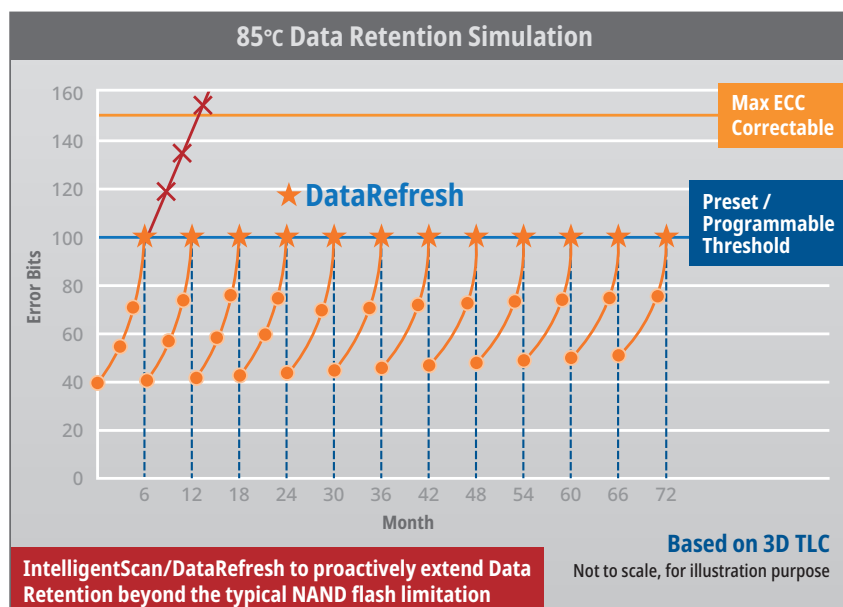


Figure 2: IntelligentScan™ and DataRefresh ensure enhanced data-loss and error correction, extending SSD service life.

Robust and Corrosion Resistant

Further features include real-time error correction on the fly, giving capabilities such as SER handling, and self-recovery. FerriSSDs combine conventional BCH and RS coding engines for first-level error correction with Silicon Motion's advanced and efficient second-level correction using low-density parity check and group page RAID algorithm (Figure 3). The result: extended service life and resilience against all kinds of potential interference and sudden errors.

FerriSSD with DefendMax™ also benefit from a superior corrosion resistant design, with golden finger treatment and sulfur-resistant passive components such as resistor arrays. The drives are specified for DWPD (Drive Writes Per Day) to ensure faultless reliability and satisfy the total host write volume throughout the product lifetime.

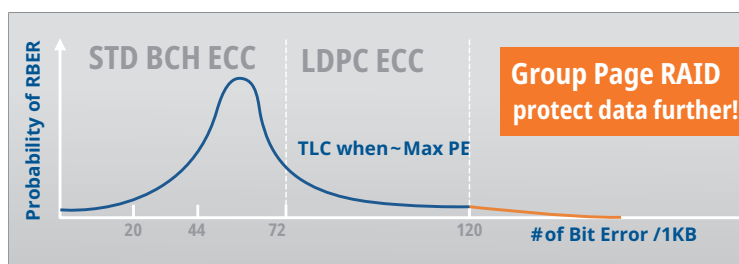


Figure 3: First- and second-level error correction, with additional group page RAID for superior resilience.

Product series	PCIe FerriSSD	SATA FerriSSD
Host Interface	PCIe 4x2 (4) PCIe 3x2 (4)	SATA 6Gb/s SATA 3Gb/s
Dimensions	20 x 16mm BGA	20 x 16mm BGA
Capacity range	4~960GB	4~480GB
NAND type	SLCmode TLCmode	SLCmode TLCmode
DRAM	HMB Support	Built in DRAM

Table 1: FerriSSD Specifications

Conclusion

FerriSSD combines industry proven controller technology with Silicon Motion's advanced protection against environmental hazards and malicious threats, with highly reliable NAND Flash chips and associated components in a robust BGA package.

With its compact form factor, high performance, and rugged design, FerriSSD is perfectly suited to meet the unique challenges of demanding applications in both embedded and portable systems. Reliability, durability, and security are essential to meet the stringent requirements of rugged applications, ensuring operational effectiveness in mission-critical scenarios.

For more information about Ferri Family, please go to www.siliconmotion.com or send email to ferri@siliconmotion.com