

SAMSUNG

Driving The Future with Technology Leadership

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Unrivaled Capacity and Accessibility

SAMSUNG | XILINX.

SmartSSD[®]

Computational Storage Drive

[Product Brief](#)

[Available now from Xilinx](#)

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Challenge: Turning Big Data Into Fast Data

The growth of machine- and user-generated content provides tremendous opportunity for business insights, but the sheer volume of data creates challenges for secure storage, retrieval, processing and analysis. Traditional storage and server architectures rely on moving all data through a host CPU for processing. Moving the data creates bottlenecks between storage and CPU and reduces the usable processing resources at the CPU. The result is substantial and unpredictable delays.



Solution: Bring Computation To The Data

The SmartSSD® drive performs high speed computations on the data where it is stored. Combining a Samsung solid state drive (SSD) and a Xilinx Field-Programmable Gate Array (FPGA), with a fast private data path between them, the SmartSSD drive enables efficient parallel computation at the data itself. This frees up a host CPU to handle other higher level tasks more efficiently.

Example Applications

The SmartSSD® computational storage drive is a flexible, programmable platform that developers can use to create a variety of unique and scalable accelerators for competitive advantage. The range of functions performed on the SmartSSD drive is limited only by developers' imaginations.

Primary Usage Of The SmartSSD Drive	Example Acceleration Functions Performed By The SmartSSD Drive
Data Acceleration Services	<ul style="list-style-type: none"> Compression/Decompression Encryption/Decryption Erasur Coding Metadata management Data format conversions On-the-fly video transcoding
Analytics Acceleration Services	<ul style="list-style-type: none"> Database and data lake acceleration Predicate pushdown for ad-hoc queries on databases: e.g. scan, filter, aggregate Searching of data logs Image recognition/object detection Media content distribution AI/ML inference

Performance Examples*

Real Time Analytics & Business Intelligence:

2.8x faster SQL query execution on Parquet data, and performance scales with additional SmartSSD drives

Rich Media:

3 SmartSSD drives reduce CPU utilization by 87% while maintaining the same video transcoding frame rate

Data Services:

24 SmartSSD drives operating in parallel read LZ4 compressed data at 72 GBps and decompress at line rate

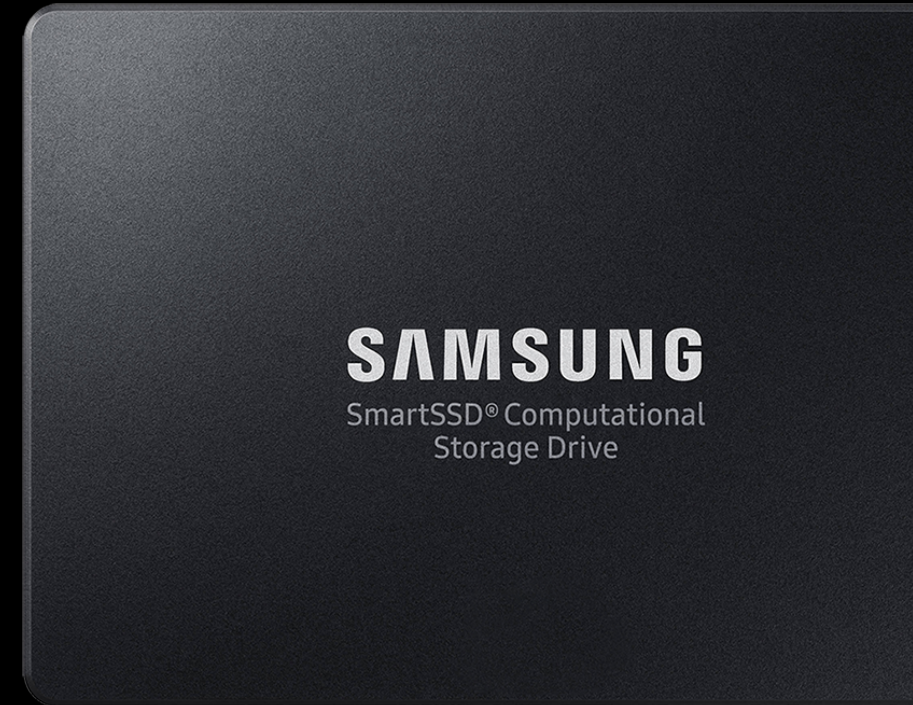
SmartSSD® Drive Benefits

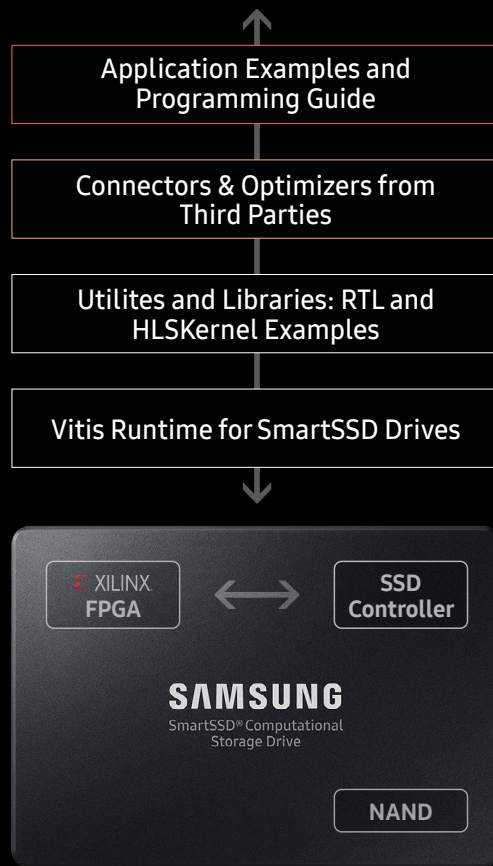
- **Technology Leadership:** The SmartSSD drive integrates SSD and FPGA from the technology leaders, Samsung and Xilinx.
- **Leading NAND and proven SSD Controller:** A high performance Samsung Enterprise SSD controller SoC provides Flash Translation Layer and Flash Management functions.
- **Fast and Flexible Acceleration Engine:** The SmartSSD drive contains the Xilinx Kintex Ultrascale+ FPGA, fully dedicated for acceleration. This delivers extreme parallelism, deep pipelining, and high power-efficiency for data path intensive tasks.
- **Scalable Performance:** Accelerator processing power and accelerator-to-data bandwidth scale with the amount of data and the number of SmartSSD drives. SmartSSD-based servers remove PCI-Express bottlenecks, producing near-linear performance scaling even on an over-subscribed host CPU.
- **PCIe Lane and Space Savings:** Other computing accelerators (e.g. GPUs, external FPGAs) use up precious PCIe lanes in the host CPU. In contrast, the SmartSSD drive connects via PCIe lanes already used for storage, freeing up lanes for additional storage and/ or networking.

Available now through our partner Xilinx

Visit <https://www.xilinx.com/smartssd> to learn more.

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Flexible Accelerator IP Development Options

- **Third party IP development:** Samsung and Xilinx partners provide IP and acceleration solutions for deployment on the SmartSSD drive. Custom IP development is also available via partners.
- **Redeployment of IP:** From Cloud to Enterprise workloads, Xilinx tools provide seamless FPGA IP mobility.
- **Simplified development:** The Xilinx Vitis environment allows development in C, C++, or OpenCL. By using a fixed “Design Support Archive” (DSA) I/O shell, developers can achieve high productivity by focusing only on the accelerator kernel under development.
- **HDL development:** The Xilinx Run Time environment allows access to the full spectrum of hardware description languages (HDLs), including Verilog and VHDL, for maximum design flexibility and optimization. This design flow also simplifies the re-use of existing accelerator IP designed in HDL for ASICs or FPGAs.

Internal Data Path

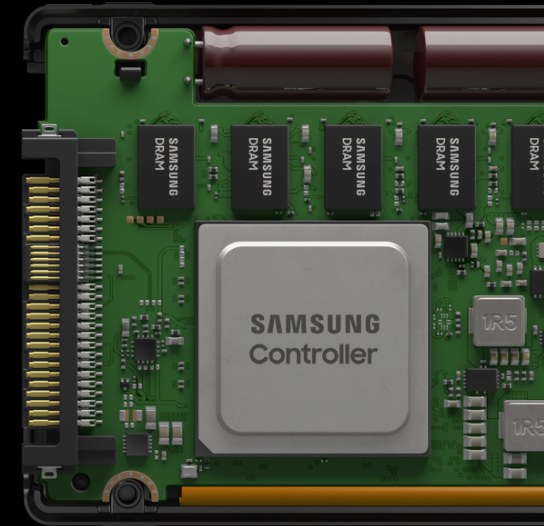
The SSD controller provides the NAND media interface and management while the FPGA provides logic elements and CPU cores for acceleration. A private, high-speed peer-to-peer link connects the SSD controller to the FPGA and transfers data between them. This internal bandwidth scales as SmartSSDs are added to a system.

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Samsung SZ1735a Z-SSD

Unlock your Data Center's potential

Product Brief



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Unlock your Data Center's potential

The optimal configuration for systems in the data center is constantly evolving. IT and data center managers are tasked with finding high performing and extremely dependable memory solutions while maximizing ROI. Recent advances in flash technology have produced more economical, lower endurance SSDs. While fit for mass storage, they alone cannot fulfill the stringent requirements imposed on the enterprise data center. A buffer is needed, something which can withstand intensive write operations without introducing a performance bottleneck.

That's where the SZ1735a Z-SSD comes to the rescue. A specialized SSD designed with the modern data center in mind. By providing the highest throughput and endurance along with the lowest possible latency, the SZ1735a allows IT managers to fully realize the economics of the latest innovations without sacrificing system performance or reliability.

Samsung SZ1735a delivers

Extreme Performance

Through PCIe Gen 4, the SZ1735a delivers over 7GB/s Sequential and 1.8M IOPS Random Read speeds, making it the highest performing SSD ever.

Unmatched Endurance

Offering up to 30 times the endurance of mainstream SSDs, the SZ1735a can withstand even the most write-heavy workloads.

Use Case Optimized

The Samsung SZ1735a Z-SSD is optimized to excel in write-intensive workloads as a high endurance, low latency buffer. This ultra-high performance SSD is particularly suitable for write buffering, read-caching, logging, metadata, and similar use cases.



Optimized for the most demanding use cases

In the age of All-Flash arrays, not all flash is created equal. While this affords IT managers the advantages of flexibility in design and budget, it also requires ensuring the right flash is being used in the right places.

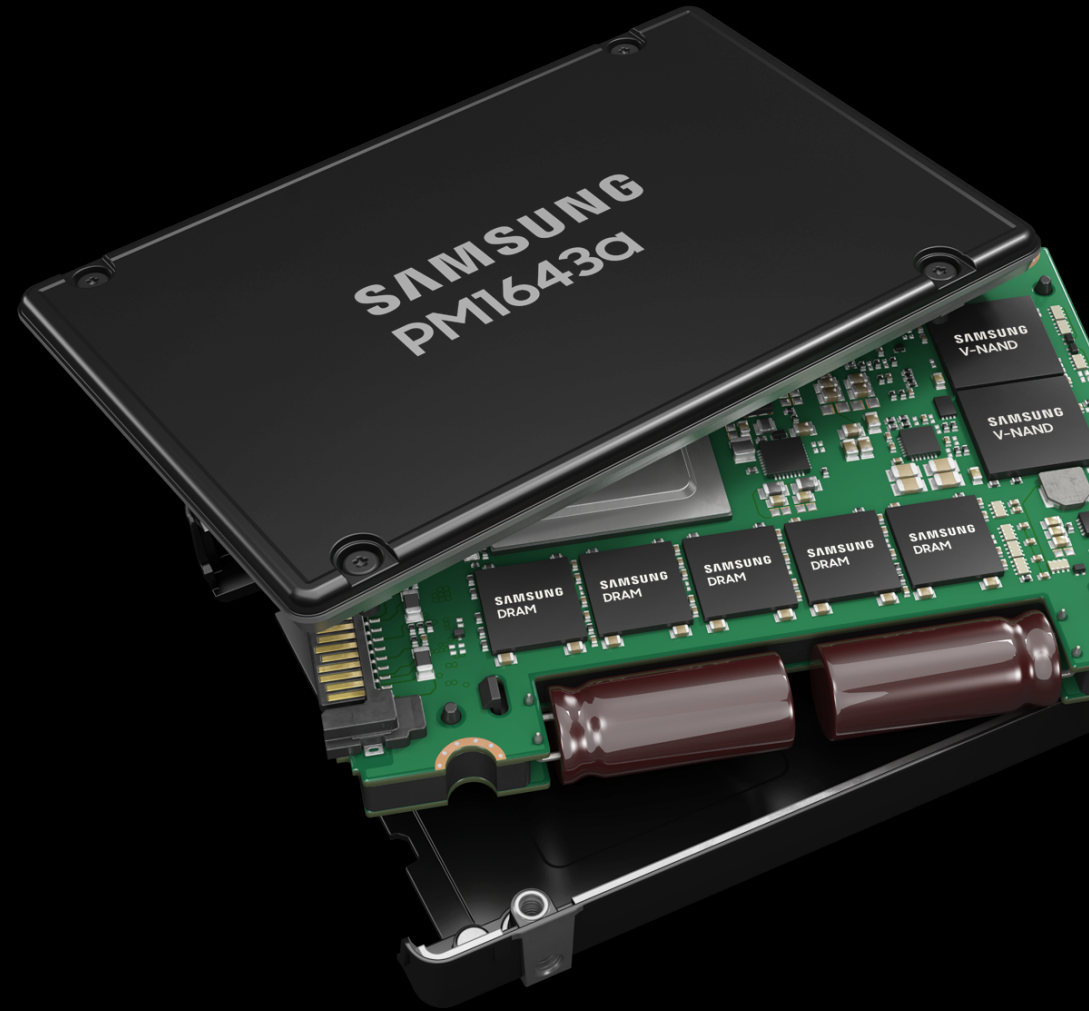
The Samsung SZ1735a Z-SSD is purpose-built to excel in the most intensive data center use cases. Operations such as write buffering and heavy-duty logging will wear down a mainstream SSD in no time, resulting in costly replacements and reduced ROI. The SZ1735a provides the endurance required to fulfill these critical functions reliably, so your mainstream storage can do what it's designed for, and you can get the most out of your investment.

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Samsung PM1643a SAS 12 Gbps SSD

Unrivaled Capacity and Accessibility

Product Brief



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Samsung PM1643a delivers

High-Performance

With Read/Write performance more than 4x that capable with SATA, the PM1643a 12G SAS SSD provides a massive upgrade to the data transfer capabilities of your storage array, no forklift necessary.

High-Capacity

The PM1643a supports a range of capacities, from 960GB to an industry leading 30.72TB.

High-Availability

PM1643a supports dual-port functionality, enabling two access paths to the storage array controller. The PM1643a delivers the reliability, availability and serviceability (RAS) that is required for enterprise storage designs.

