SMART Modular Technologies®

Gen-Z Memory Module (ZMM)

High Density, High Speed, High Bandwidth, Low Latency

Gen-Z, ZMM

SMART Modular Technologies' Gen-Z scalable computing interconnect protocol provides a simplified interface based on memory semantics and is designed to handle advance workloads, enabling data centric computing with scalable memory pools and resources for real-time analytics and in memory applications. The Gen-Z standard was developed to enable new solution architectures for delivering high levels of performance (high-bandwidth, low-latency), software efficiency, power optimizations, and industry agility.

Why the ZMM?

New type of design challenges

- The increase in number of CPU cores has not been matched by an increase in memory bandwidth leading to memory bandwidth starved CPU cores. By being able to support more memory interfaces and memory modules Gen-Z serial attached ZMM memory increases memory bandwidth per core increasing system performance.
- Gen-Z ZMM memory provides load-store direct addressing to memory by applications eliminating operating system and device driver overhead. CPU cores spend more time executing end applications.

Workloads are changing

- Latest HPC models and AI/ML algorithms require large pool of memory to store intermediate data sets. These data sets require concurrent access from multiple compute nodes. Thus such workloads need large pool of shared memory, independent of any compute node.

New Generation of Hardware

- As network speeds are increasing, the latency difference between local attached memory and remotely accessible memory is decreasing. Addition of specialized hardware accelerators running cache coherent protocols is reducing the latency gap.

Features & Benefits

- Multiple access semantics support (Byte and Block addressable DRAM access, In-band configuration, Access Key/Region Key memory isolation opcodes)
- Gen-Z Phy support (16 total links - 4x, 4-lane links, 802.3 25Gbps), with 4 requestor and 4 responder configuration
- Write command collision detection and ordering logic with support for 9 to 11 cycles of CAS write latency at 2400 MTS
- Media scrubbing (background ECC detection and correction)
- Gen-Z Lane Reduction support

Product Description

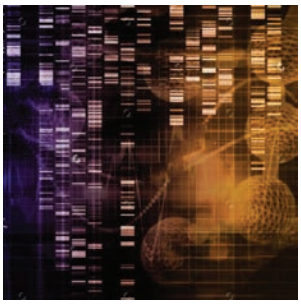
- Gen-Z Form Factor 4C-SFF-TA-1008/9 (EDSFF 3-inch form factor compliant)
- Available in 64/128/256GB capacities of dual rank DDR4 memory with ECC.
- Available in user-programmable FPGA variant to allow adding custom logic for differentiation, or add hardware engines in FPGA, which can offload specific functions to memory module, right next to where data resides.

Applications

- In -Memory Analytics
- Similarity Search
- Large-scale Graph Inference
- Financial Modeling

Transforms Performance

Modify existing frameworks



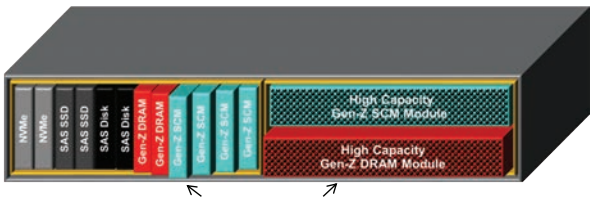
New algorithms

Completely rethink

In-memory analytics	Similarity search	Large-scale graph inference	Financial models
15x faster	**20x** faster	**100x** faster	**8,000x** faster

Composable Memory Concept

Gen-Z Enabled System/Chassis

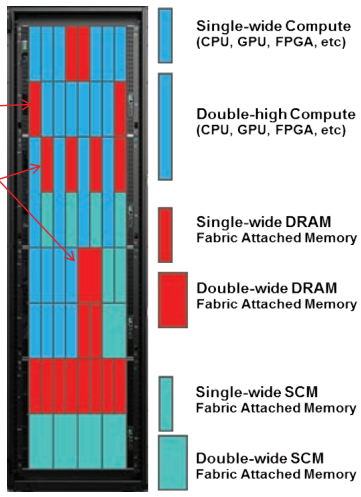


DRAM/SCM can be placed wherever storage is placed!
Utilize existing or new form factors

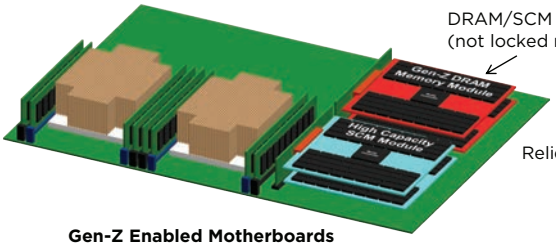
DRAM/SCM can be placed anywhere in a rack!

Utilize compute, storage, or new form factors

Gen-Z Enabled Rack-scale



DRAM/SCM can be placed anywhere!
(not locked near CPUs)



Relieves electrical/thermal constraints

Gen-Z Enabled Motherboards

Ordering Information

Gen-Z, ZMM		
SMART Part Number	**Density**	**Form Factor**
STZAB25G7B4Q36SM	256GB	Gen-Z 3.0" Form Factor 4C-SFF-TA-1008/9 (104.90 x 76.00 x 16.80mm)
STZAB64G7B4S36SA	64GB	

For other ordering options, questions or quotes please send e-mail to Arthur Sainio arthur.sainio@smartm.com.

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