



**SMART**<sup>®</sup>  
Modular Technologies



**CXL<sup>™</sup> Updates**

August 9, 2023

## Powering growth Expanding possibilities

At SGH, we design and develop enterprise solutions that support and advance our world. Across our computing, memory, and LED lines of businesses we are focused on serving our customers by providing deep technical knowledge and expertise, custom design engineering, build to order flexibility, and a commitment to best-in-class quality.

**SGH**  
NASDAQ

**1988**  
Year Founded

**~3,700**  
Employee count

**\$1.8B**  
FY 2022 Revenue

**2,154**  
Patents &  
Applications

**\$3.62**  
FY 2022 Non-GAAP  
EPS

Notes: Employee count reflects full-time employees. FY 2022 financial results do not include Stratus Technologies, which was acquired on August 29, 2022. Per share measures reflect the February 2022 two-for-one share split. See appendix for GAAP to non-GAAP reconciliation.



Memory Solutions



**PENGUIN**<sup>™</sup>  
SOLUTIONS



Intelligent Platform Solutions (IPS)



**CREE** ⇄ **LED**

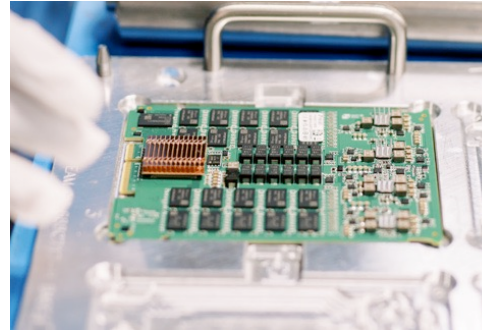
LED Solutions

# SMART Modular Product Lines



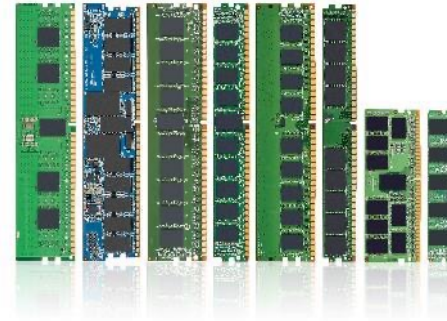
## DRAM Components

Wide range of memory solutions



## Flash Products

Comprehensive portfolio of standard and ruggedized products



## DRAM Modules

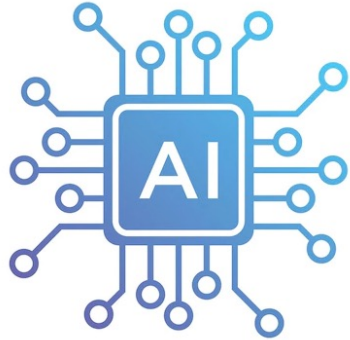
Wide range of leading edge module solutions



## Legacy Support

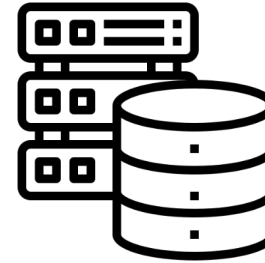
Delivering cost-effective continuity of supply and logistics solutions

# CXL™ Applications and Use Cases



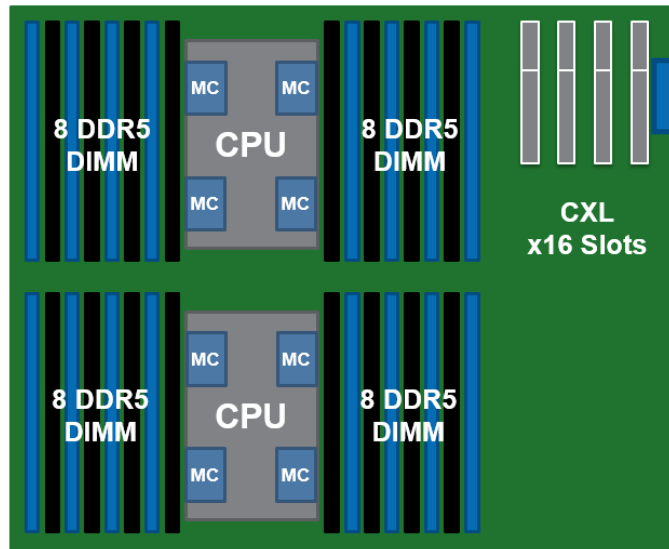
## AI & Machine Learning

- Natural language processing
- Image recognition
- Autonomous vehicles

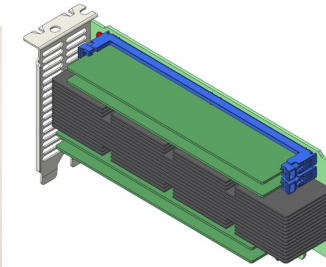


## Large scale in-memory databases

- Video editing
  - Banking/Financial
- Real time analytics



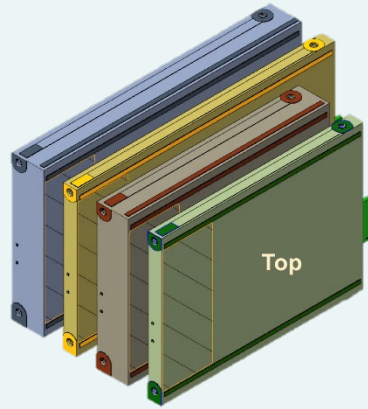
DDR5 Server Motherboard



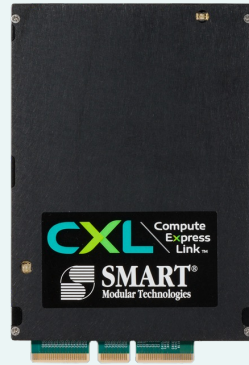
## CXL™ AIC Memory Expansion

## EDSFF

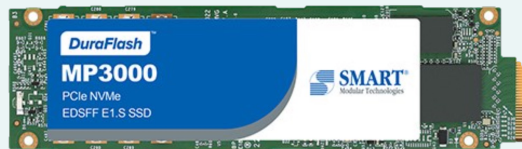
Enterprise & Data Center SSD Form Factor



**E3.S and E3.L  
1T and 2T**



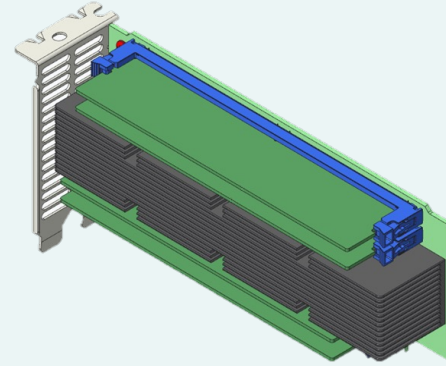
**SMART E3.S 2T**



**E1.S**

## AICs

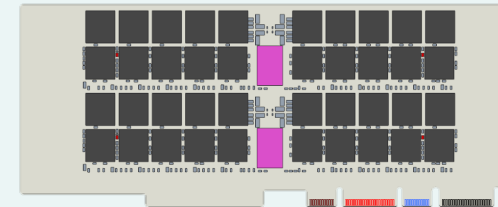
Add-In-Cards



**4-DIMM AIC (DW)**



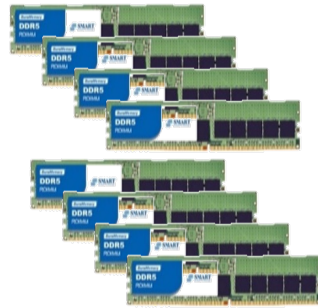
**8-DIMM AIC**



**Custom AIC**

# Cost Reduction Case Study – 1TB Memory System

Total  
DRAM  
Cost



8 x 128GB DDR5 RDIMM

57% Less

Cost  
with  
CXL



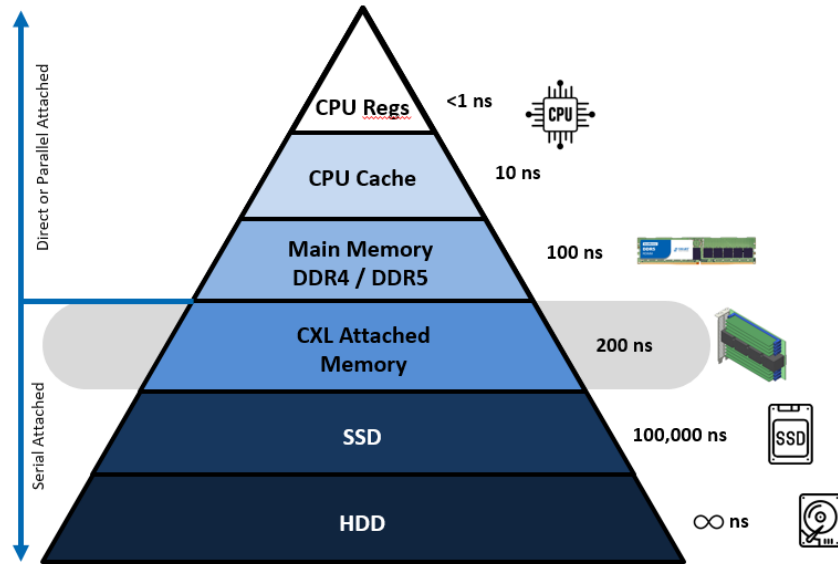
8 x 64GB DDR5 RDIMM

+

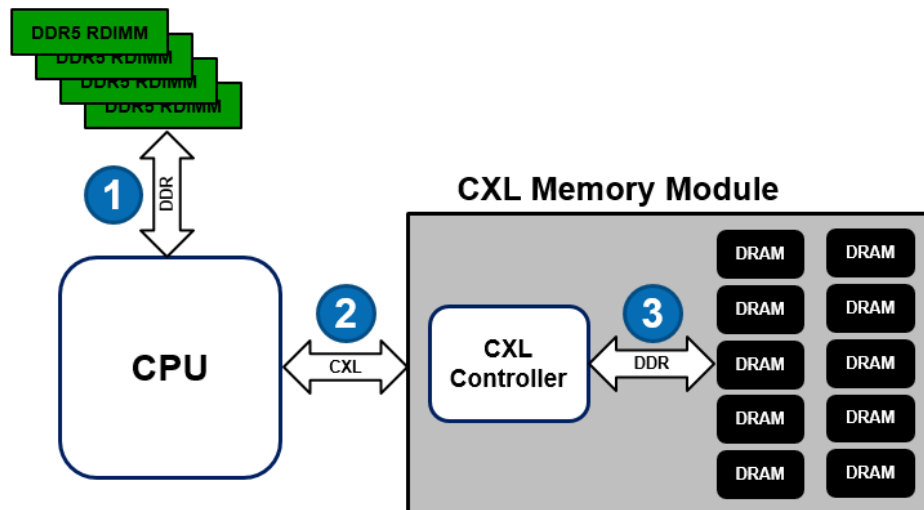


8-DIMM CXL AIC w/ 64GB  
DDR5 RDIMMs

# Preliminary Performance Results



Latency	Theoretical	Measured
DDR5-4800	100 ns	100.5 ns
CXL x8	200 ns	<b>209.4 ns*</b>



	Bandwidth	Theoretical	Measured
1	DDR5-4800	38.4 GB/s	29.9 GB/s
2	CXL x8	31.5 GB/s	<b>27.3 GB/s*</b>



\* Limited by initial CXL Controller DRAM speed



## Industry Standards Expertise

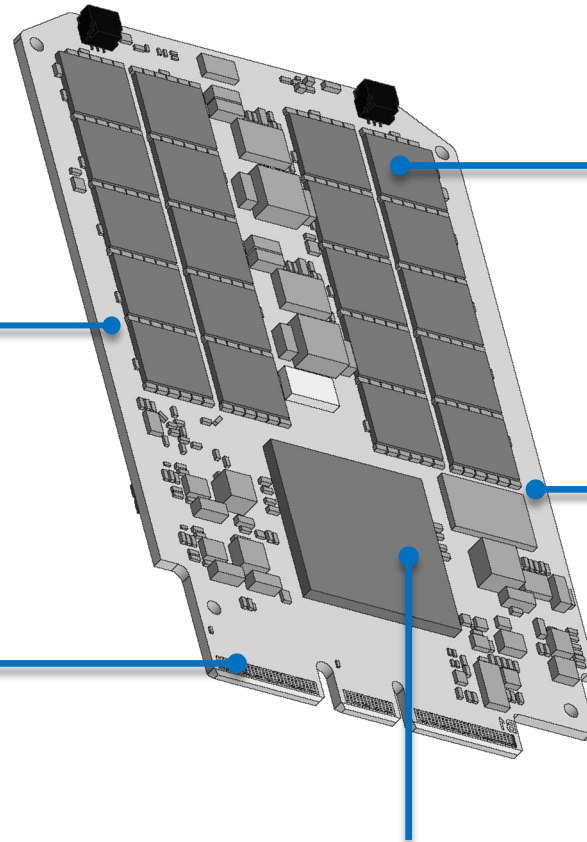
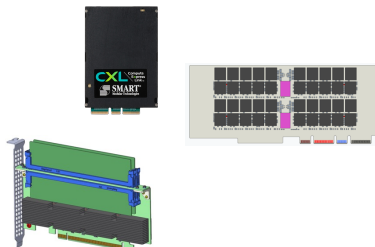


## Validation & Test Expertise

- Memory and CPU qualification
- Memory Validation
- Test program development

## Serial Standards and Solutions Expertise

- PCI Express
- NVMe
- Growing CXL Portfolio
  - E3.S
  - AICs
  - E1.S
  - NV-XMM



## CXL Controller Partnerships

## Memory Expertise

- Extensive DRAM & NAND Product Lines
- Exceptional Industry Partnerships
  - Memory Suppliers
  - RCD Vendors
  - CPUs Vendors

## Complex Memory + ASIC/FPGA Controllers Card Expertise

- Hardware Design
- FW & Software
- Test and Reliability
- High Volume Manufacturing
- High Quality trusted supplier to Tier 1 OEMs

# SMART CXL™ Memory Support!





**SMART<sup>®</sup>**  
Modular Technologies



**Thank You!**