

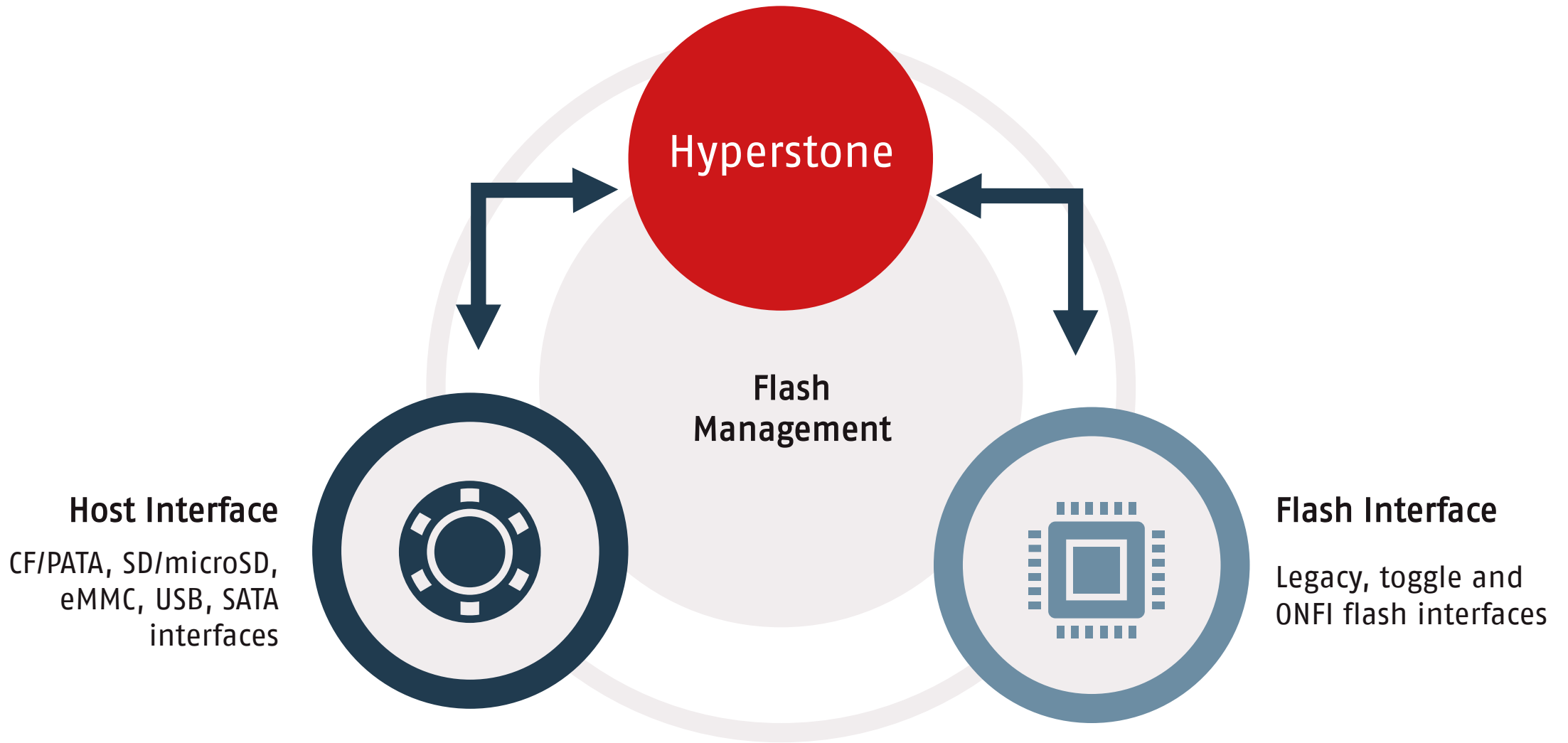
Company Presentation



We empower the
digital and connected
world by reliably
storing and protecting
data

Data Communication & Flash Management

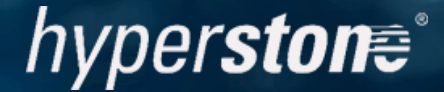
The integral component responsible for data communication between host and flash interfaces



There's more to a
secure and
performant storage
system than meets
the eye.

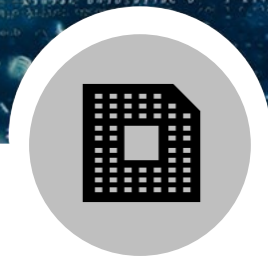
Hyperstone

At a glance...



Long Term Support

Excellent technical support
Long-term availability
Firmware customization options



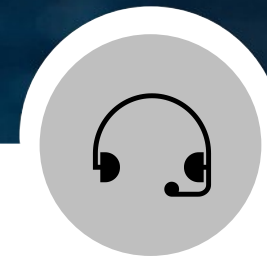
Ruggedized Design

hyReliability™ firmware architecture
Industrially qualified Hardware
Powerful Error Correction



Secure Controller

Additional feature enabler
Ready for security applications
Infrastructure for Smart IC
Proprietary microprocessor



Experience

Supporting demanding industrial domain since 1990
Optimized life cycle management

Corporate Milestones



1990

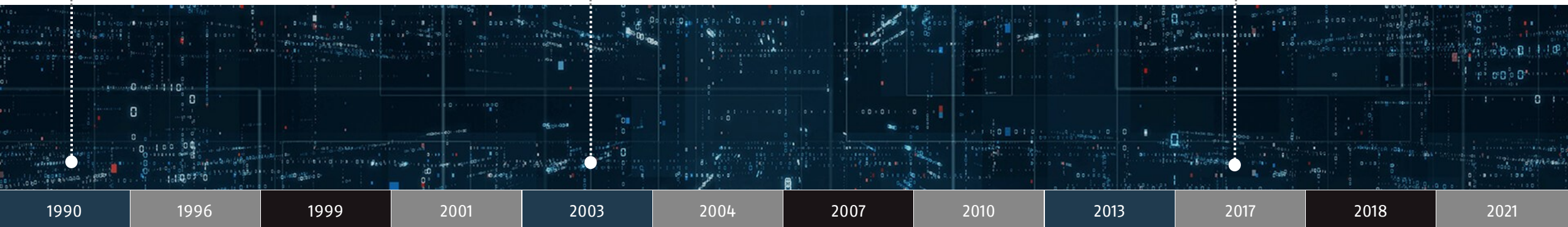
Hyperstone founded

2003

Hyperstone acquired by CML
Microsystems PLC

2017

Opened west coast office in
California



2001

Opened Taiwan office

2004

Opened east coast office
in North Carolina

2021

Swissbit aquired
Hyperstone

hyperstone



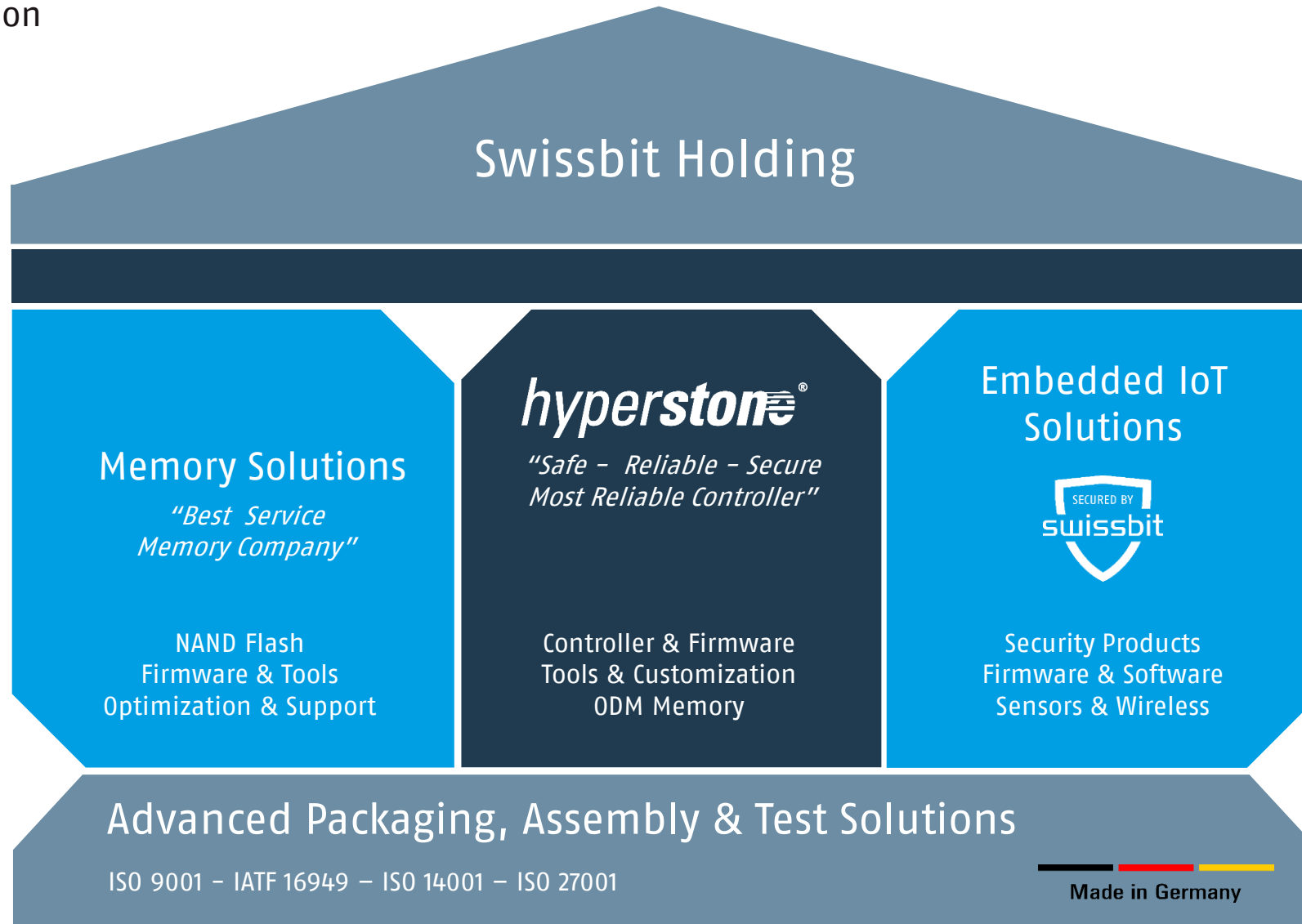
Global Presence

With over thirty years experience and teams across America, Asia and Europe, Hyperstone's industry-leading partners provide world-class wafer-subcontracting, packaging and testing services which enable our customers to produce state-of-the-art products for industrial, embedded, automotive and global communications storage application.

www.hyperstone.com

Hyperstone embedded within Swissbit Holding

Group Organization



Hyperstone embedded within Swissbit Holding

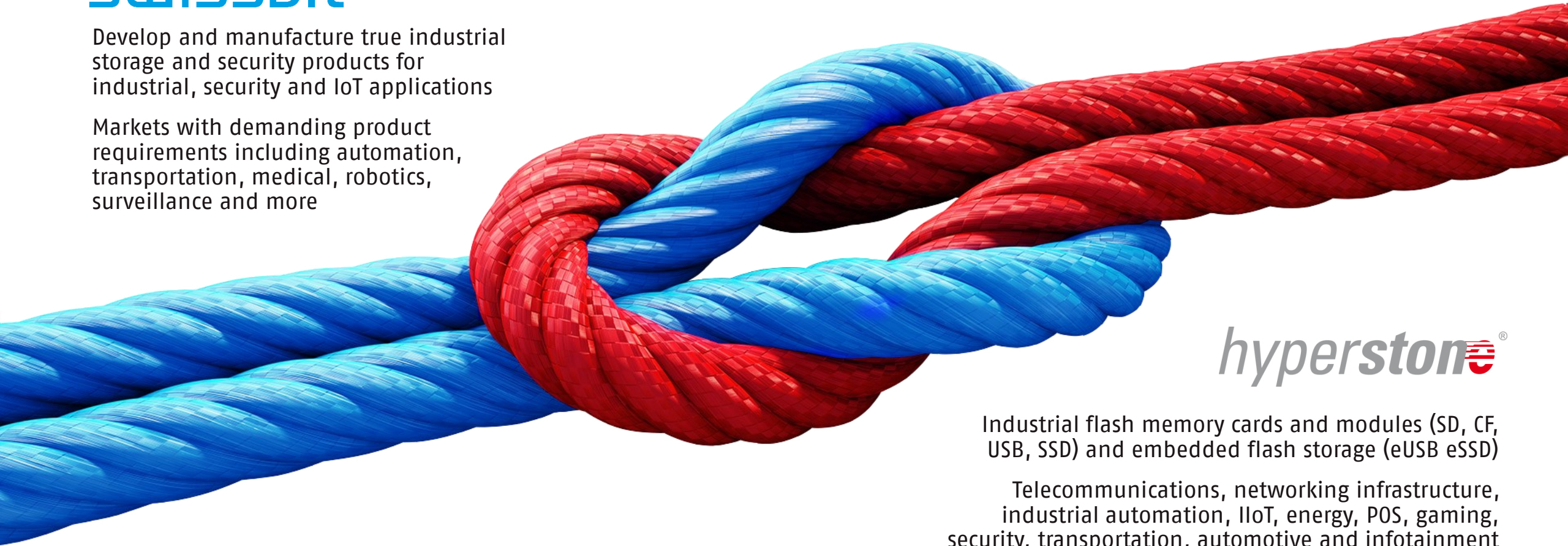
Complementary competences embedded in a strong group of companies



swissbit®

Develop and manufacture true industrial storage and security products for industrial, security and IoT applications

Markets with demanding product requirements including automation, transportation, medical, robotics, surveillance and more



hyperstone®

Industrial flash memory cards and modules (SD, CF, USB, SSD) and embedded flash storage (eUSB eSSD)

Telecommunications, networking infrastructure, industrial automation, IIoT, energy, POS, gaming, security, transportation, automotive and infotainment



Vertical Markets



Total Cost of Ownership



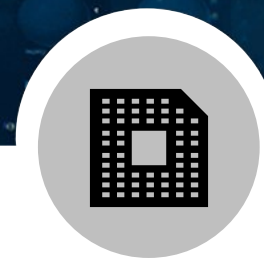
Initial System Cost

BOM (Bill of Materials)
Installation and
integration of hardware
and software
Product support
efficiency



Operating Expenses

Diminished performance
and reliability
Security (breaches, loss of
reputation, recovery and
prevention)
Backup and recovery



Long Term Expenses

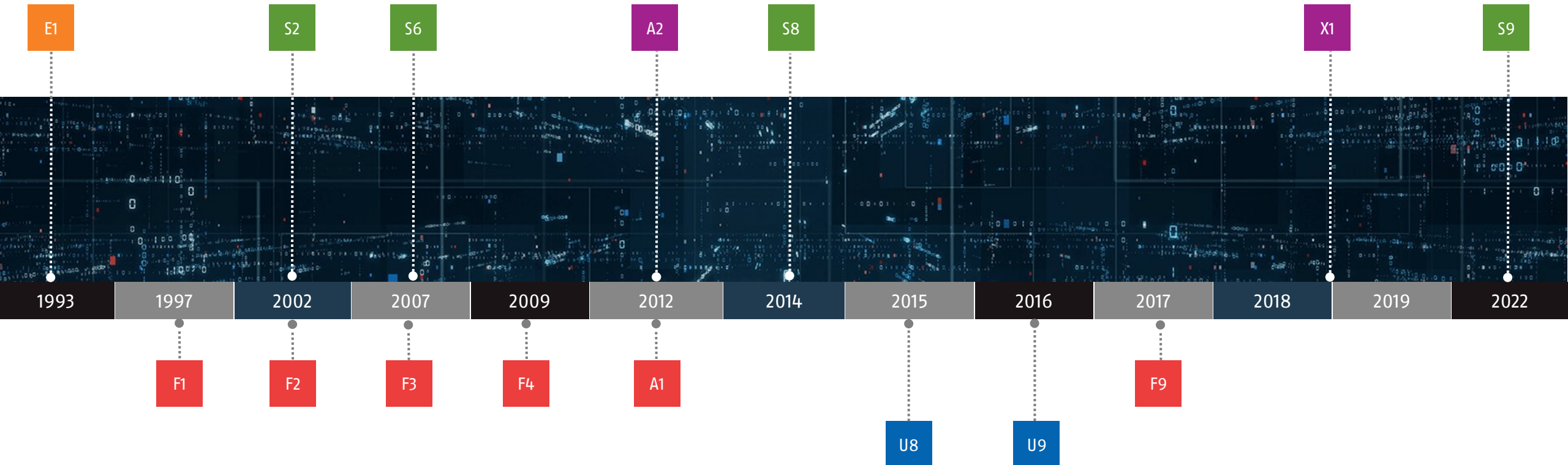
Obsolescence
management
Re-qualification
Scalability



Intangible Expenses

Branding
Future business
opportunities

Product Milestones



hyMap® Flash Management

Hyperstone Controller Firmware

For maximum reliability, a long system lifetime and secure data handling.

- Patented Mapping Technology
 - Sub-page based FTL (US9311234)
 - Mapping granularity can be defined at compile level (default is 4K mapping units) to fit use case and prolong device lifetime
- Rugged against sudden power fails and high random performance thanks to DRAM-less operation
 - Mapping entirely stored in flash
 - Highest data integrity
- Reliable operation without need for capacitors
- Background garbage collection
 - Low impact on perceived performance
- Detailed block level statistics to ensure reliable operation over the entire device lifetime
- Focusing on maximum endurance and random write performance

Firmware Highlights



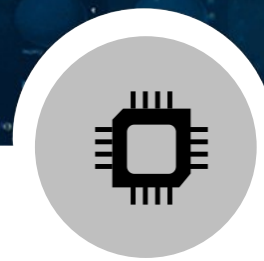
Dynamic Data Refresh™

Data is continuously monitored and refreshed: Near-miss ECC refreshes hot data, active background scanning can be configured to protect cold data.



Power Fail Robustness

Transaction orientated logging of mapping changes if last data written was corrupted, latest valid entry is recovered.



hyMap® sub-page based FTL

Small mapping units improve 4K random write performance and reduce WAF. FTL implemented w/o external DRAM.



Security & API

Firmware API to implement advanced security features and Customer Firmware Extensions (CFE).

TECHNICAL WHITE PAPERS

Download a range of technical white papers from our website to learn more about NAND flash technology



White Papers

Available

- Non-Volatile Memory
- Flash Controller Technology
- Flash Memory Form Factors
- Hyperstone Controller Technology
- Application Programming Interfaces
- Power Fail Robustness
- Security in Storage Systems
- Understanding Performance
- Embedded Disk-on-Board
- Addressing SEU
- Error Correction Coding
- FlashXE Technology
- hyMap® Technology
- pSLC vs. Fast Page
- Power Consumption
- hySMART Health Monitoring
- Industrial Gateways for 5G Networks

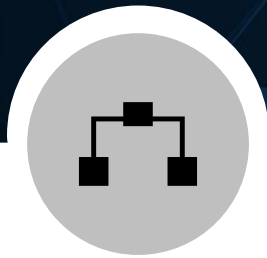
Industrial Grade NAND Flash Controllers

PRODUCT GUIDE

Download our Product Guide from the Hyperstone website to learn more about our Controller Portfolio

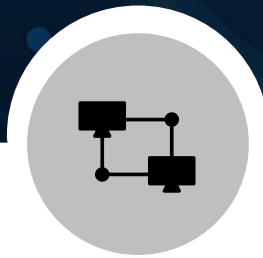


Hyperstone Security Landscape



Encryption and Cryptography

Symmetric Encryption – AES
Asymmetric Cryptography – RSA, ECC
Secure Hash – SHA2, SHA3



Secure Computing Environment

Secure boot
Secure update
eFuse as OTP



Security Standards

FIPS 197, FIPS 180-4
FIPS140-2 and NIST SP 800-193
and CC certification achievable at system level



Additional Security Configurations

Hyperstones API allows companies to configure additional security features to a storage module



Achieving a unique secure solution

Our expertise and support together with the API kit and your use-case expertise



OUR EXPERTISE

Over 30 years experience in
NAND flash controller design
and development



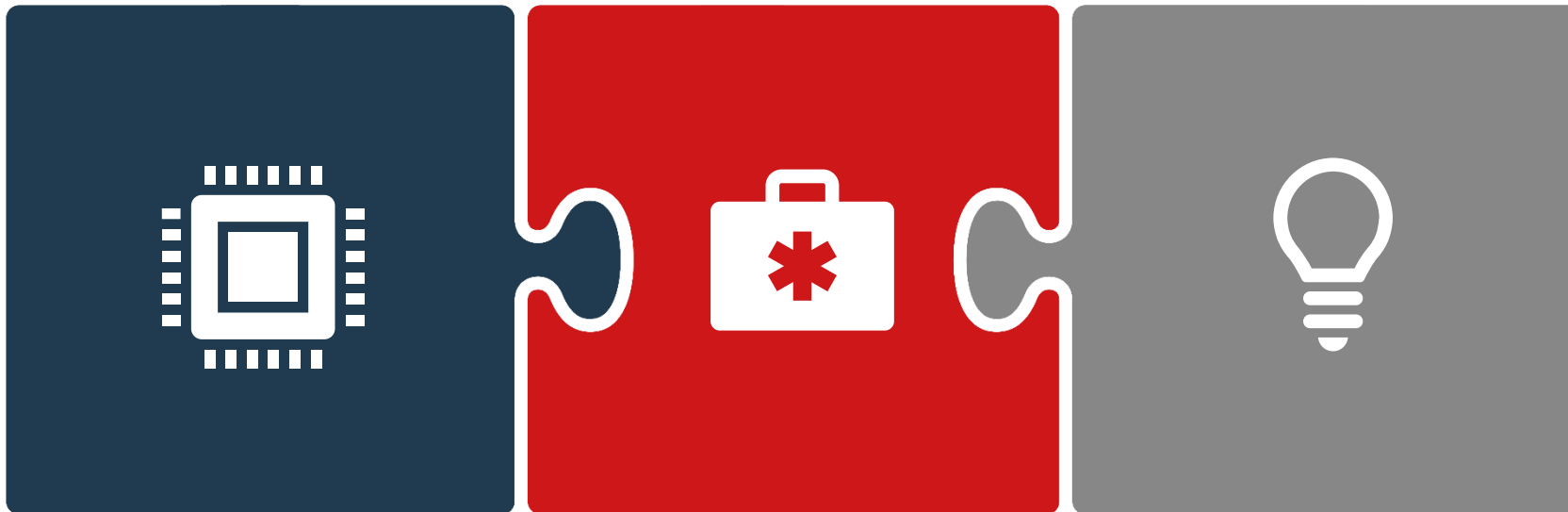
API KIT

Enable customer firmware
extensions to design secure
and unique storage
solutions



YOUR EXPERTISE

Tailor your storage design to
your unique use-case and
end application demands



F9 CF/ PATA Controller

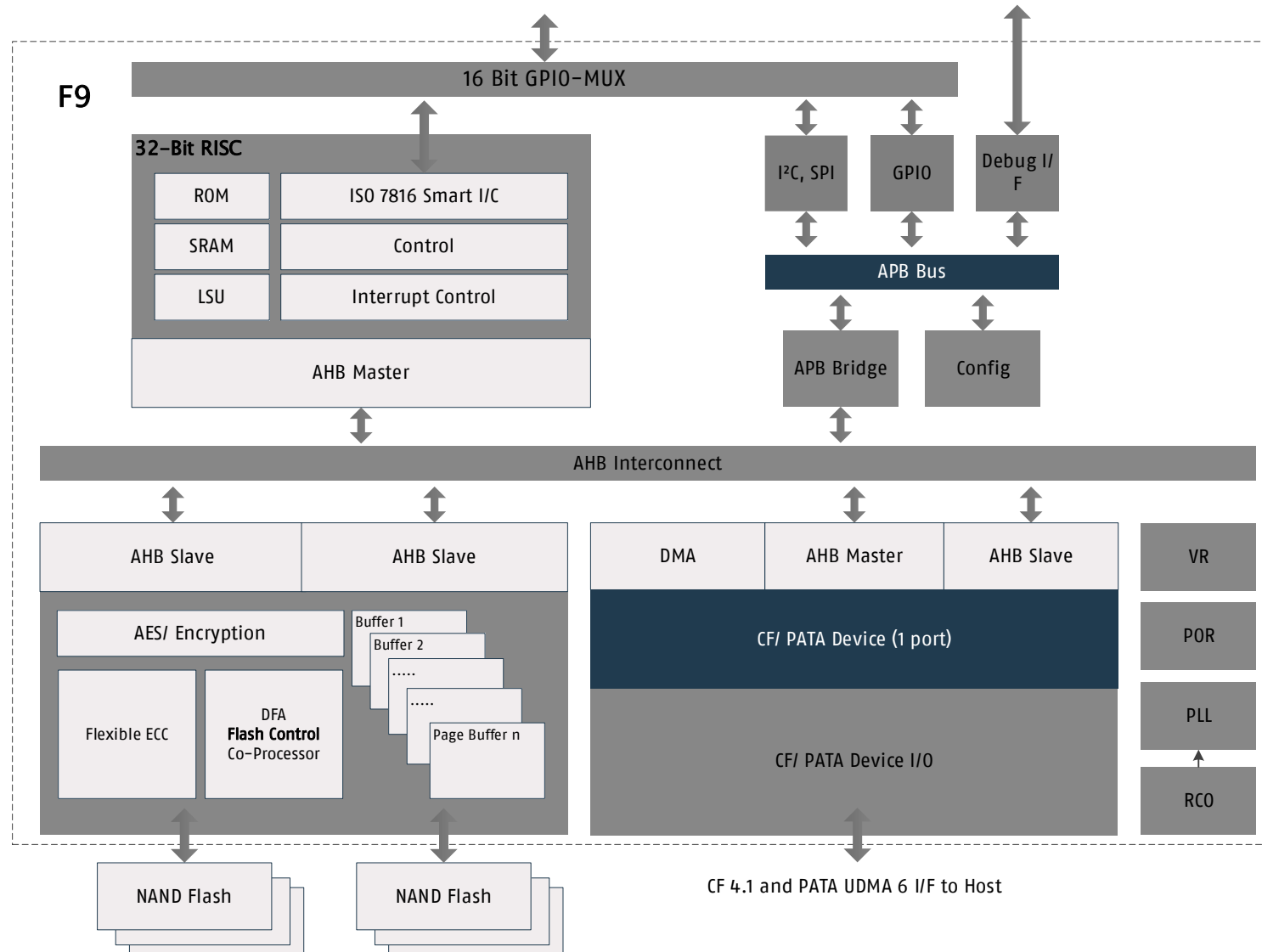
Compliant to CF 4.1 and PATA UDMA 6 specifications



- Fully industrial qualified Flash controller (−40° to + 85°C)
- Continuously updated Flash Support List (SLC, pSLC, MLC, 3D)
- Sequential read/write up to 120MB/s
- Compatible to CompactFlash™ 4.1, 5.0 and 6.1

F9 CF/ PATA Controller

Compliant to CF 4.1 and PATA UDMA 6 specifications



U9 USB Controller

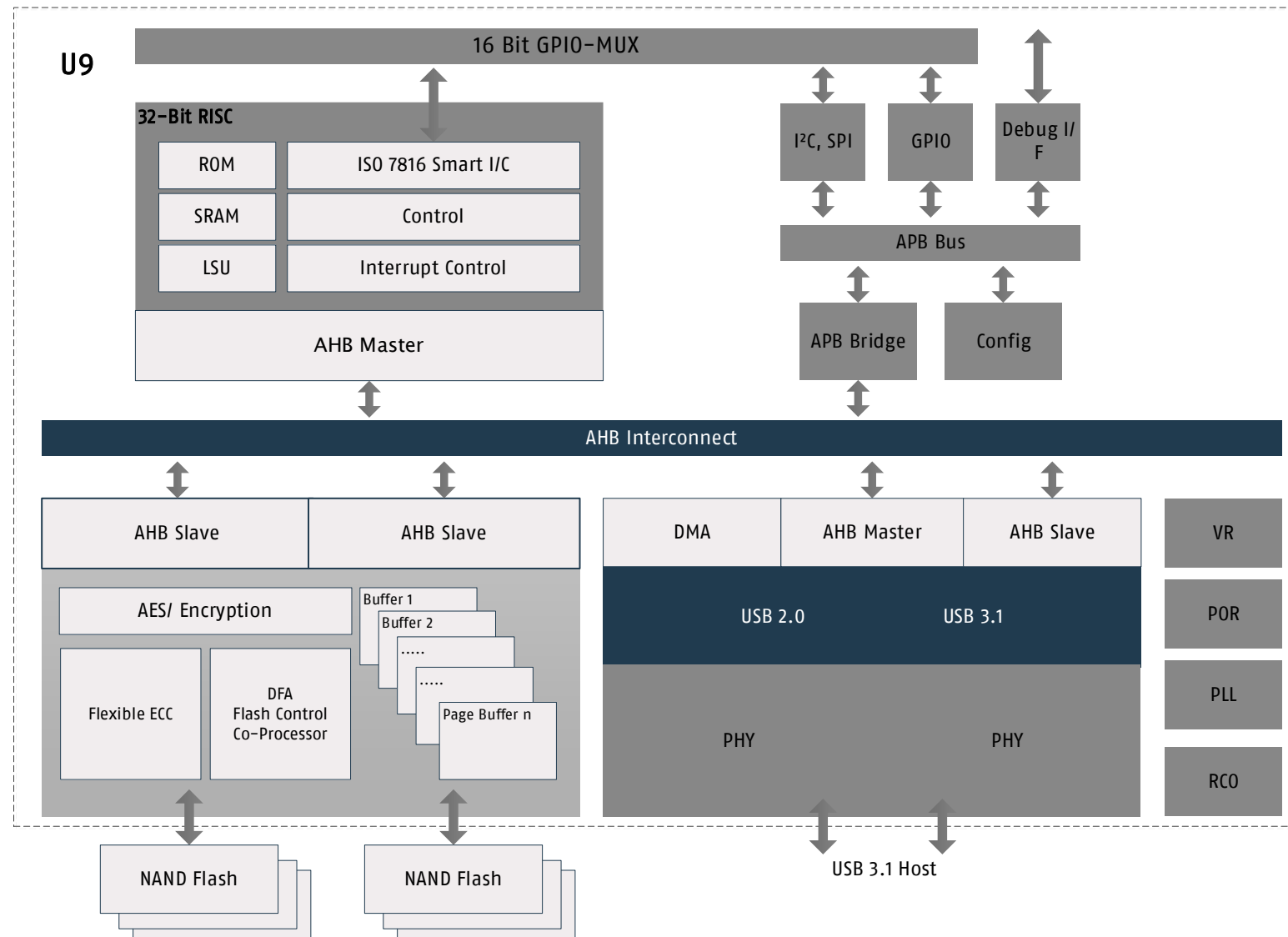
Compliant with USB 3.1 Gen 1 specifications



- Support of all Flash Memories (with ECC up to 96-Bit BCH/1K)
- Optimized 32-Bit RISC core for Flash handling
- High performance on-the-fly AES Encryption and further security possibilities through API
- Continuously updated Flash Support List
- Long Term Availability with reference schematics & firmware manufacturing kit
- FTL mapping, endurance, Power Fail Robustness and Dynamic Data Refresh®

U9 USB Controller

Compliant with USB 3.1 Gen 1 specifications



X1 SATA Controller

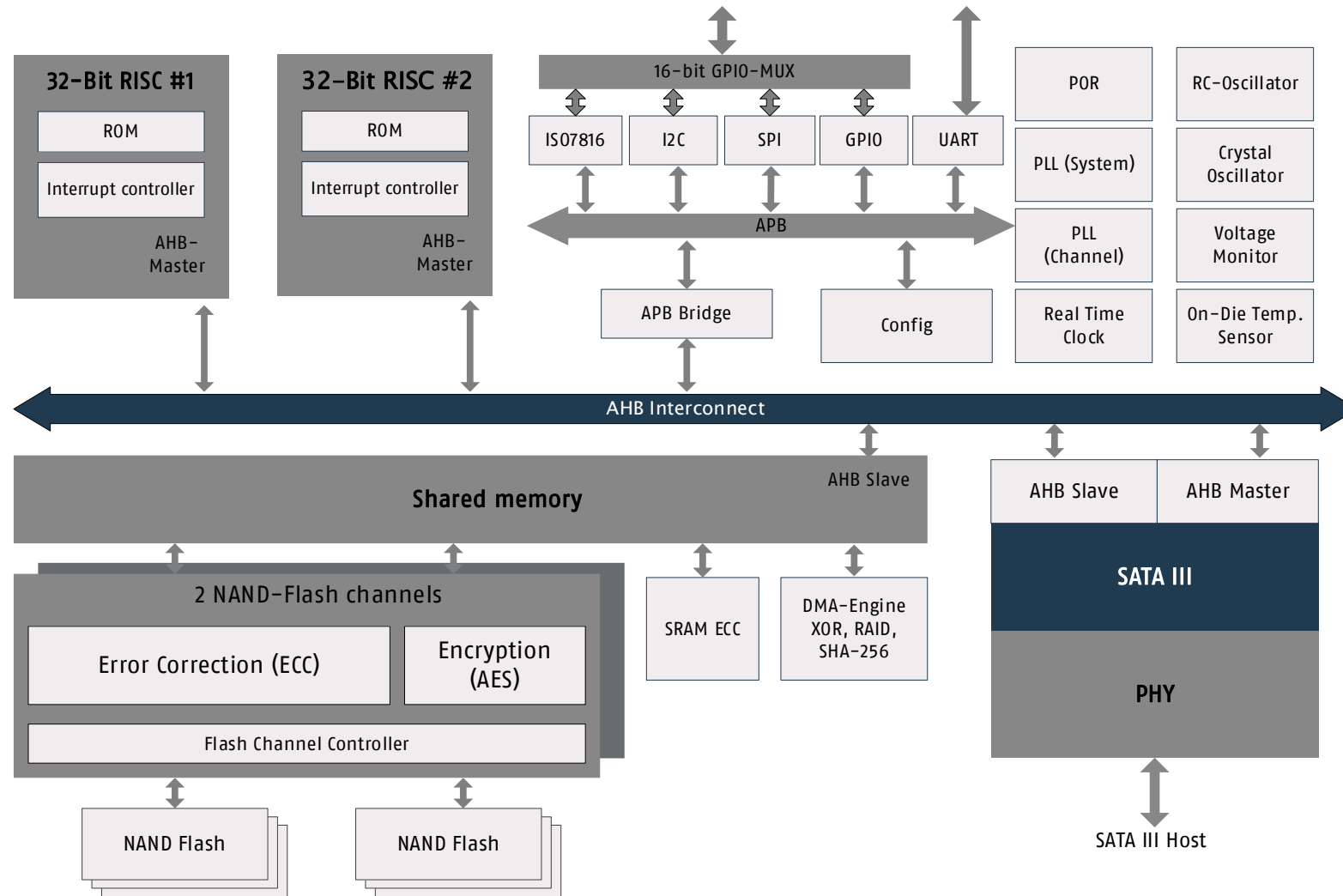
Compliant with SATA 3.3 specifications



- Continuous updates and SLC, MLC, TLC, 3D, pSLC, pMLC flash support (1.8V VCCQ)
- Sequential write performance >400 MB/s
- Sequential read performance >500 MB/s
- Steady state random performance Write IOPS: 8K
- Steady state random performance Read IOPS: 15k
- Security features (AES), API support and TCG/Opal 2.0

X1 SATA Controller

Compliant with SATA 3.3 specifications



S9S Security Controller

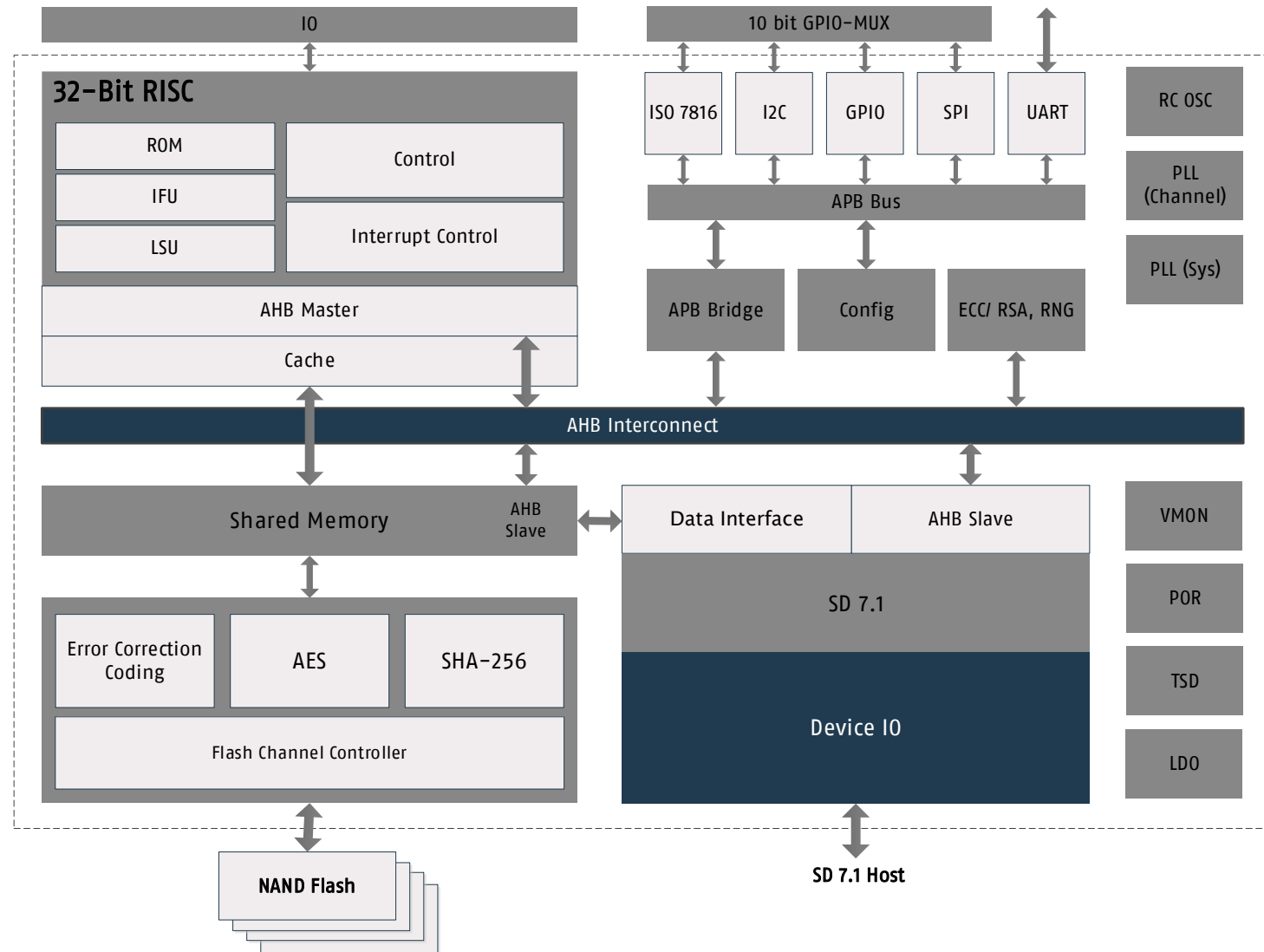
Compliant with SD 7.1 specifications



- Continuous updates and SLC, MLC, TLC, 3D, pSLC, flash support
- Up to 90 MB/s sequential read/write
- Security features (AES) API support
- Health monitoring tools

S9S SD Controller

Compliant with SD 7.1 specifications



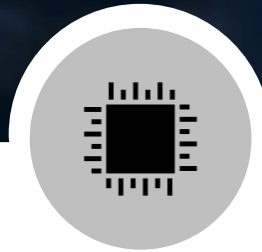
Tools & Utilities

Tools & Utilities



hySMART™

Access and analyze ATA standard and Hyperstone vendor-specific SMART data and lifetime information through a GUI provided by Hyperstone.



Use Case Tracker

Gain insights into your systems workload to establish which flash best support your design needs.



hyAdmin™

Ensure easy configuration and preformatting of a device and ensure this is carried out securely through the hyOperator tool with a plug and preformat set-up.

hySMART & hySMARTlib



hySMART™

Utility to access and decode ATA Standard and Hyperstone vendor-specific SMART data and lifetime information through GUI

SMART Data Analysis Tool User's Manual delivered with it



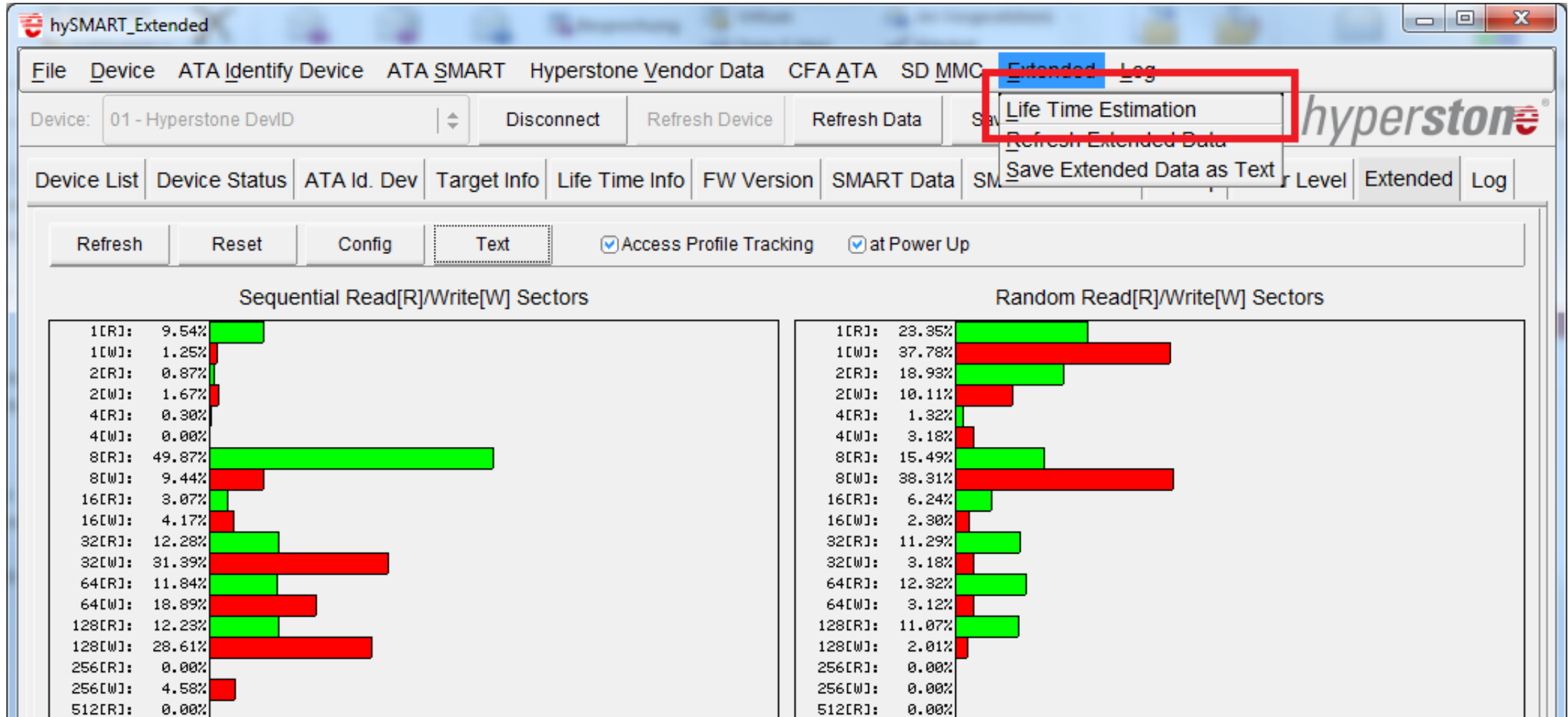
hySMARTlib

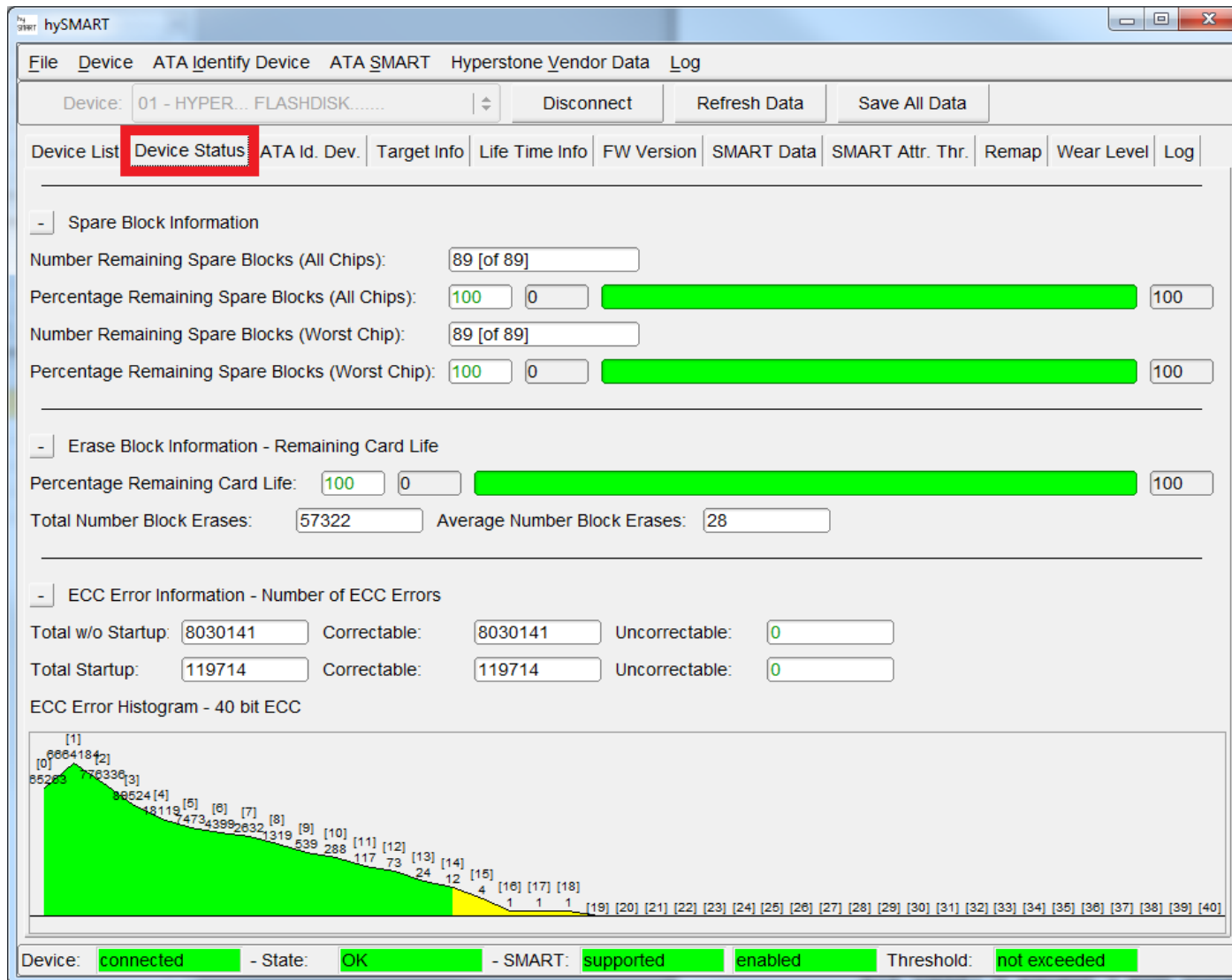
Backbone functions of hySMART

Provided as C++ source code

Can be used directly by the customer to gather SMART info and process them to analyze reliability and make decision accordingly

Use case tracker hySMART™ for cost and lifetime optimization





- hySMART utility/ GUI to access and decode ATA Standard and vendor-specific SMART data and life time information
- hySMARTlib, backbone functions of hySMART, provided as C++ source code

Contact Us



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Thank you.