

STORAGE & MEMORY Embedded & Removable | DRAM Modules | High Reliability SSD

passion.experience.reliability.



Essential criteria

As a long established and owner-operated company, we always act according to the features reliability and liability, honesty and transparency as well as flexibility and discretion. Customer satisfaction confidence and commercial added value are basis for successful cooperation.

Reliable and strong partnership

We put the strength in working together exclusively with well-respected and leading manufacturers and suppliers. We achieve confi dence and consistency in the market for more than 60 years. We do implement your demand on product quality and availability.

All-over processes and significant quality

The certification according to DIN EN ISO 9001:2008 proves the continuous representation of our processes. All procedures and workflows are location and department-overall recorded. This guarantees you, as our valued customer a maximum of safety and transparency in the complete process chain.

High advisory skills and solution

We confi rm the confi dence of our customers by fulfi lling and exceeding their expectations. Our competence of individual consulting and target-oriented solutions are refl ected in our custom-fi t products. Have a look by yourself!

Market knowledge from A to Z

Besides our specialized product portfolio we distinguish ourselves with profound branch knowledge. We use this know-how in order to give an optimum of product support. You can always rely on our extensive technical expertise from A like Acrich High Voltage Technology to Z like Zhaga LED modules. Our experts are always beyond one's nose and give you full support during your complete project realization and do also consider alternative solution approaches, if necessary.

Onwards with sophisticated steps

Neumüller Elektronik has been a successful electronics distributor of electronic components and systems for more than 60 years. With its expertise in the fields of optoelectronics, lighting, sensors, power supply, electromechanics, hi-rel, alarm & acoustics, RFID, circuit breakers and industrial storage solutions, Neumüller Elektronik is a valued partner in the development of customer-specific applications.





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SMART Modular Technologies

SMART Modular is a global leader in specialty memory solutions. SMART Modular delivers solutions to a broad customer base, including OEMs that compete in the computing, networking, communications, storage, mobile and industrial markets.

SMART Global Holding

The SMART family of companies are global leaders in specialty memory solutions serving the electronics industry for over 30 years.

Focused on providing extensive customer-specific design capabilities, technical support and value-added testing services, the SMART companies collaborate closely with their global OEM customers throughout their design process and across multiple projects to create memory solutions for demanding applications with differentiated requirements.

The SMART companies have led the way over the past 30 years providing standard and custom products to today's leading global OEMs crossing all major electronic Industrys. Taking innovations from the design stage through manufacturing and supply, SMART Modular Technologies has developed a comprehensive product line comprised of DRAM and Flash memory technologies across various form factors. SMART High Reliability Solutions offers high-performance, high-capacity solid state drives ("SSDs") for defense, aerospace and industrial automation markets. SMART's presence in the U.S., Europe, Asia and Latin America enables it to provide its customers with proven expertise in supply-chain management, international logistics and asset management worldwide.



Embedded Flash Storage



Removable Flash Storage



DRAM Modules



High Reliabilty Solutions

GLOBAL FOOTPRINT

DESIGN MANUFACTURING TEST



Embedded Storage Solutions eMMC – Slim SATA – mSATA – M.2 SATA MODULE – eUSB



eMMC

SMART's eMMc Product Family is designed to meet the rigid requirements of Industrial, Medical and Networking segments where technical support, extended life and stable roadmaps are critical in choosing the right supplier.

» Industry » Network » Medic



Slim SATA

SMART's Slim SATA X10, XL+, and Value Series (SATA III) are JEDEC MO-297A standard embedded SSDs. Slim SATA is ideally suited for use in a wide variety of OEM storage applications that require multiple supply chains, design interoperability, rapid time to market, and long product life cycles. The X10 product is SMART's latest product, which has enterprise class features, including NAND RAID protection.

» Industry » Network » Telecommunic	ations » Archiving
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mSATA

SMART's mSATA X10, XL+, and Value Series (SATA III) are JEDEC MO-300A standard embedded SSDs. Providing high performance in a small form factor, mSATA is ideally suited for use in a wide variety of OEM storage applications that require multiple supply chains, design interoperability, rapid time to market, and long product life cycles. The X10 product is SMART's latest product which has enterprise class features, including NAND RAID protection and over provisioning to increase endurance.

» Industry	» Network	» Telecommunications	» Archiving	
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M.2 SATA Module/PClexpress



Utilizing an industry standard M.2 SATA interface and connector, XR+, XL+, X10, and Values Series product in 2242, 2260 and 2280-D2-B-M form factors offer best-in-class sequential and random read/ write performance in transaction intensive applications. M.2 SATA can be easily integrated into a host system without any special BIOS modifications or additional device drivers. SafeDATA[™] Technology is a safeguard data against data corruption during power loss.

» Storage	» Industry	» Network	» Server	» Telecommunications
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M.2 SATA MODULE with SafeData[™]

SMART's new M.2 XR+ products come with proprietary SafeDATA technology, which combines unique power loss detection and hold-up circuitries with an advanced controller firmware algorithm to flush in-flight data from volatile cache to NAND Flash memory in order to safeguard data against corruption and/or loss during an SPL event. Safedata technology can prevent many system issues including an OS corruption.

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eUSB

SMART's industrial-grade embedded USB (eUSB) flash drives feature sustained read speeds of up to 33 MB/s, write speeds up to 21 MB/s and seek time of typically 500 uS. eUSB Plus integrates SMART's industrial grade eMMC product and a USB bridge chip to create a cost-effective eUSB solution.



2.5"SATA SSD

SMART's 2.5" X10 SATA (SATA III) SSDs provide low power, high reliability solid state storage. These SSDs can be used as a direct replacement for an HDD or in ruggedized notebooks and other embedded mobile applications. The X10 is SMART's latest product which has enterprise class features.

» Network » Server

» Telecommunications



CF CARD

SMART's CF Cards are high-capacity, low-power memory cards that act like hard drives but are reliable, fast and portable. These cards also support self monitoring analysis and reporting technology (S.M.A.R.T.) attributes to help reduce unexpected field failures

» Industry

» Network » Server

» Telecommunications



SD CARD | microSD

SMART's industrial SD and microSD cards are robust and reliable solutions for solid state storage needs. Not to be confused with consumer grade cards, SMART's SD cards are designed, built and tested to far higher standards of reliability and endurance.

» Industry » Server

» Telecommunications

SMART's Audular Technologies

USB Memory Key (SLC Technology)

SMART's Enterprise USB Memory Key address the need for enhanced reliability and are designed with the industry's best-in-class read and write speeds, providing reliable operation over the product life cycle.

» Network » Telecommunications » Medical



SMART Memory Solutions commercial und industrial grade | DDR – DDR2 – DDR3 – DDR4

DDR4



SMART supports a complete lineup of DDR4 memory modules. The advantages of the DDR4 platform are higher speed, higher density and better performance. Actual the SMART DDR4 modules works with 1.2 Volt and double speed in comparison to the DDR3 modules which works between 1.35 and 1.5 Volt.

SMART conducts a rigorous design review process to ensure optimal performance and reliability.

» Storage	» Industry	» Network	» Server	» Telecommunications



DDR3

SMART's DDR3 modules are available with data transfer from 800 to 1866 MT/s and densities from 512 MB to 64 GB. SMART offers configurations as example like "registered", unbuffered with ECC" and "unbuffered without ECC". SMART offer a wide variety of products with JEDEC complaint and derivatives in the industry.

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DDR2

SMART's DDR2 modules are available with data transfer from 400 to 800 MT/s and densities from 512 MB to 16 GB. Smart offers configurations as example like "registered", unbuffered with ECC" and "unbuffered without ECC", "FBDIMM", "MiniDIMM" and "SO-DIMM".

SMART offer a long product life cycle and legacy support.

» Storage	» Industry	» Network	» Server	» Telecommunications
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DDR

The speed of the DDR is nearly double of the "single-data-rate" SDRAM technology. SMART offers JEDEC compliant and 100 % tested DDR modules

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SMART Memory Solutions

DDR4 NVDIMM with SafeStor™-Technology

SMART's DDR4 NVDIMMs combine nonvolatile memory functionality with highspeed DDR4 DRAM technology. DDR4 NVDIMMs provide a persistent memory solution to significantly accelerate application performance in server and storage appliances.



Features & Benefits

- Fits standard 288-pin DIMM socket
- During normal operation, NVDIMM will function as a standard RDIMM module
- During a power loss, the contents of the DRAM are automatically backed up to Flash
- NVDIMM with Encryption also offered as an option

SMART'S DDR4 NVDIMM feature proprietary SafeStor[™] technology, the engine which initiates backup and restore operations upon command from the host controller. The NVDIMM also support multiple command delivery options to trigger SafeStor[™] backup during a host detected power outage and recovery events. All while functioning as a JEDEC standard DDR4 RDIMM during normal operation.

NVDIMMs support Autonomous Self Refresh (ASR). SMART's patented ASR feature allows the NV-DIMM to independently initiate a backup in the event of an OS crash (operating system), CPU fault, MCU fault, BIOS hang, blue screen, or other motherboard failures which result in a hang without power loss where the customer has data in the DIMM that they want to save and recover after a system is reset to recover from the hang.

» Network » Server » High Speed Applications

MIP with DDR3 & DDR4 Technology

Space, power and reliability are in focus

SMART's MIP (module in a package) is a Tiny Form Factor (TFF) memory module that combines the benefits of industry standard SO-DIMMs with SMART's proprietary stacking technology.



About the size of a nickel, SMART's MIP occupies 1/5th the area of a SO-DIMM while offering higher performance and lower power. Key advantages of the MIP over SODIMMs include 42% power savings, 42% jitter reduction, and 39% PK/PK savings. MIPs contain on-package address and control signal termination, eliminating the need in DRAM-down board usage scenarios.

Features & Benefits

- Occupies only 1/5th the space of an SO-DIMM
- Up to 42% power savings vs SO-DIMMs
- Superior ruggedness soldered down; no sockets or clips
- Leverages SMART's proven stacking technology



Enterprise Memory[™] The Highest Quality | Most Reliable Memory Available



Improve quality while reducing costs

SMART's Enterprise Memory will help you meet those goals. Having failure rates fall consistently below 200 parts per million speaks directly to quality. And this quality, in turn, provides significant savings for OEM customers in field service costs and substantially decreases the downtime experienced by their end customers. SMART's Enterprise Memory are developed through a unique system-level test burn-in process.

This service provides highly reliable memory modules for long-term service life in mission critical server and storage applications. By submitting DRAM modules to "key up-front" burn-in stresses on SMART developed equipment, only the best modules make their way through the manufacturing cycle.

SMART's Enterprise Memory brings tremendous value and that's everyone's goal.

Features and Benefits:

- Tested at an ambient temp up to ~85° C
- Runs on customized test software and custom server boards for up to 24 hours
- Proven low associated DPPM
- Can use SMART-built DIMMs or other vendor's DIMMs
- Improves OEM's product reputation for high reliability
- Lowers OEM costs due to
 - Reducing servicing costs
 - Minimizing warranty and spares overhead



Military | High Reliability Serie (HRS)

Failure is not an option



SMART High Reliability Solutions is dedicated to developing the industry's most rugged, reliable, and secure SSDs that meet the needs of a wide variety of demanding applications found in the defense, aerospace, industrial automation, transportation, medical, energy, telecommunications and other Industrys.

SMART's SSDs are loaded with standard features utilizing SLC flash, along with options such as AES encryption and Secure Data Elimination Technology (SDET), SMART's secure erase function. These features make SMART's SSDs far more robust than commercial offerings.

Additionally, SMART offers a variety of options to customize an SSD for any high reliability application.



	HRS-M4 & HRS-M4P	HRS-M1HC	HRS-M1 & HRS-M2	HRS-S3 & HRS-X3	HRS-X300
NAND Flash Type	MLC	MLC	MLC	SLC	SLC
Capacity Range	240GB – 960GB for M4 240GB – 2TB for M4P	1TB – 8TB	240GB – 2TB	60GB – 1TB	60GB – 480GB
Read/Write Performance	500MB/s Read, 260MB/s Write for M4 525MB/s Read, 500MB/s Write for M4P	480MB/s Read, 480MB/s Write	525MB/s Read, 500MB/s Write	380MB/s Read, 360MB/s Write	500MB/s Read, 440MB/s Write

Applications

Industrial	•	•	•	•	•
Defense	•	•	•	•	•
Data Recording	•	•	•	•	•
Mission Critical	•	•		•	
Surveillance	•	•		•	
Telemetry	•	•		•	

HRS-M4 & HRS-M4P HRS-M1HC HRS-M1 & HRS-M2

HRS-S3 & HRS-X3 HRS-X300

Reliability

MTBF	3M Hours for M4 >2M Hours for M4P	1.5M Hours	2M Hours	3.1M Hours	1M Hours
Data Reliability	1 in 10 ¹⁵ bits read for M4 1 in 10 ¹⁷ bits read for M4P	1 in 10 ¹⁵ bits read	1 in 10 ¹⁷ bits read	1 in 10 ¹⁸ bits read	1 in 10 ¹⁸ bits read
Data Retention	1 year @ 55° C for M4 10 years at 40° C for M4P	12 months @ 30° C	10 years @ 25° C	10 years @ 25° C	10 years @ 25° C
Endurance	1,200 total drive writes for M4 2, 100 total drive writes for M4P	2,000 total drive writes	2,100 total drive writes	10,000 total drive writes	10,000 total drive writes
Power Loss Protection	pFail	Fast Flush of Cached Data	Fast Flush of Cached Data for M1 pFail for M2	pFail	pFail

Environmental

Operating Temperature	–40° C to 85° C	–40° C to 85° C	–40° C to 85° C	–40° C to 85° C	–40° C to 85° C
Storage Temperature	–55° C to 95° C	–55° C to 95° C	–40° C to 85° C	–55° C to 95° C	–55° C to 95° C
Operating Shock	50g half-sine, 11 ms, 3 shocks along each axis	1000g half-sine, 0.5 ms	50g half-sine, 11 ms, 3 shocks along each axis	40g half-sine, 11ms, 3 shocks along each axis	50g half-sine, 11 ms, 3 shocks along each axis
Operating Vibration	16.4g rms, 15 – 2,000Hz for M4 16.4g rms, 10 – 2,000Hz for M4P	16.3g rms, 10 – 2,000Hz	16.4g rms, 15 – 2,000Hz	16.4g rms, 15 – 2,000Hz	16.4g rms, 15 – 2,000Hz
Relative Humidity	5% – 95% non–condensing	5% – 95% non–condensing	5% – 95% non–condensing	5% – 95% non–condensing	5% – 95% non–condensing
Altitude	24,384 m (80,000 ft)	30,480 m (100,000 ft)	24,384 m (80,000 ft)	24,384 m (80,000 ft)	24,384 m (80,000 ft)
Conformal Coating	Optional	Optional	Optional	Optional	Optional

Security (Protection & Data Elimination)

ATA Password	•	•	•	•	•
AES 256b	•			•	
Write Protect	•	•		•	
External HW Trigger		•		□ (S3 Only)	
Erase Key and Flash	•		•	•	•

Mil Erase Sequences

NSA/CSS Manual 9-12	•	•		
Dod NISPOM 5220.22-M				
DoD NISPOM 5220.22-M-Sup 1		•		
NSA/CSS Manual 130-2	•	•		
Army AR 380-19	•	•		
Navy NAVSO P-5239-26		•		
Air Force AFSSI-5020		•		
RCC-TG IRIG 106-07				
Custom Sequence				



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