ADVANTECH

SQFlash

ER-1
PCIe Gen.4 Edge SSD

THE BEST FLASH STORAGE SOLUTION

6 FACTS ABOUT
SQFlash

1 The best industrial storage total solution provider
Equipped with security features and software management tools

2 Industrial design with global service
Proactive design-in service, prompt and localized technical support

3 Complete power failure protection
Combines four different functions and achieves multi-level power protection

4 The most comprehensive security functions
TCG Opal compliant, firmware and hardware GPIO security mechanism

5 Proven ruggedness with advanced thermal solution
Hardware and firmware thermal solution dissipate over 30% of the heat and maintain robust performance

6 30-day customization service
Early sample access and quick design in services

High Performance

PCIe Gen.4x4 SSD Solution

SQFlash 930 and ER-1 series are designed with PCIe Gen. 4 to provide different types of general, read-intensive, and mixed-use options that enable edge storage devices to keep up with numerous, diverse real-time streaming data sources. These are excellent choices for delivering higher accuracy to AI analytics and enterprise server applications.

High Durability & Endurance

User types come with advanced durability

- Read-Intensive: DWPD 1
- Mixed-Use: DWPD 3

High Power Efficiency

90% higher performance/watt ratio, greater carbon emission reduction than Gen. 3x4

Ultimate Speed

More than double the performance of Gen. 3x4

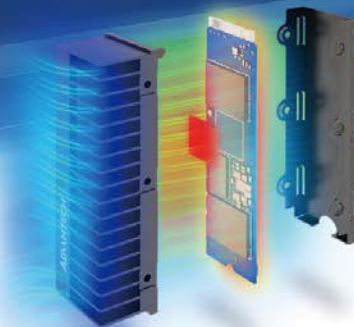## Industrial Thermal Solution with Wide Temperature Support

- Flexible thermal grease prevents physical damage
- Smart thermal throttling avoids sudden performance drop

Pioneering Thermal Solution

For NVMe SSDs

In addition to high-performance and high-capacity, SQFlash NVMe series products are designed with our market-leading thermal solution, making them even more reliable for AIoT applications in extreme environments.

Industrial Heatsink
Provides large heat dissipating surface within 15 mm standard U.2 form factor that cools SSD by up to 30 °C

Flexible Thermal Grease
Prevents physical damage to SSD components

Smart Thermal Throttling
Avoids sudden performance drop and can be customized based on requirements

Management Software
Local and remote health monitoring and lifetime prediction

Comprehensive Security Functions

SQFlash has the industry's most comprehensive security functions — for mission-critical applications; and protecting data against viruses or hackers.

- ✓ TCG-OPAL and TCG-Enterprise compliant
- ✓ Crypto Erase and Military Erase
- ✓ McAfee software integration

Host

Third-Party Integration

McAfee™

Acronis

Application

EFI & BIOS Integrated Tool – SQGuard

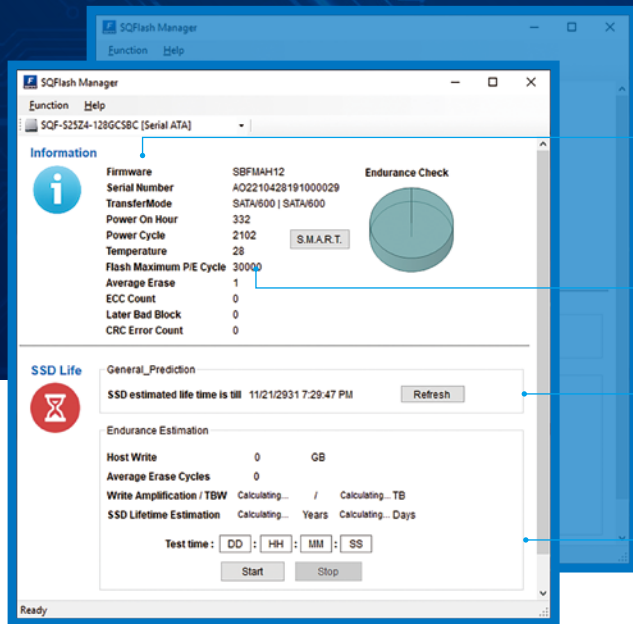| SQ Guard – SQFlash Shelf-Encrypting Drive Manager | Lock Disable |
| Function Menu | Lock Enable |
| | Remove Support Device Lock |

SQFlash Device

- Crypto Erase & Military Erase Support
- TCG Opal Compliant
- FIPS 140-2 Certified

SECURITY SSD
FIPS 140-2
LEVEL 2
CERTIFIED

SSD Health Monitoring & Lifetime Prediction

Real-Time Monitoring
Real-time SMART data shows health status

Production Record
Basic production information for tracking

General Prediction
SSD lifetime prediction based on historical usage

Endurance Estimation
Estimate lifetime after running some usage patterns over 1P/E cycle

Complete Power Failure Protection

Voltage Stabilizer
Stabilizing internal power supply

Flush Manager
Valid data kept in Flash IC
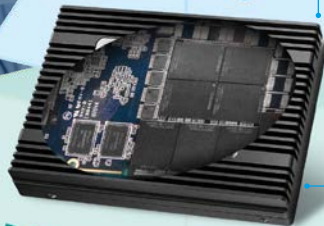
Power Failure Saver
Data integrity in Flash IC

Power Drop Catcher
Reliable startup power sequence

SQFlash *Designed for Diverse Applications*

SQFlash supports SLC, MLC, Ultra MLC, and 3D TLC types with different temperature ranges and form factors, fulfilling demands for a variety of applications.

Transportation

Automation

Aerospace/Defense

Data Center

Gaming

Medical

Additional thermal solution

Complete form factor selection

| 0~70 °C | -20~85 °C | -40~85 °C |

	High Endurance & Reliable Performance			Cost Effective & High Capacity	
Flash Type	**Planar NAND Flash**			**3D NAND**	
	SLC	Ultra MLC	MLC	3D sTLC (BiCS5)	3D TLC (BiCS5)
Cell bits	1	1	2	1	3
P/E Cycle	60K	30K	3K	50K	3K
Write Performance	Highest	Highest	High	High	Middle
Cost-per-bit	$$$$	$$$	$$	$$	$
Density	Lowest	Middle	Middle	High	Highest

Ruggedized NVMe SSDs

For in-vehicle data logging systems

Enterprise-Class SATA SSDs

For blood analyzers

Requirements

- High-capacity data collected in a small storage system
- Wide operation temperature support for diverse application environments
- Prevention of unauthorized access and theft

Solution

- High-performance SQFlash PCIe Gen4 ER-1/Gen3 920 Up to 16TB per drive
- Support -40 ~ 85 °C with built-in SQF own industrial heatsink
- TCG Opal compliant and Crypto Erase among other security features.

Requirements

- 5-year product longevity with strict revision control
- SMART information in an assigned registry and format
- Reliable power failure protection
- Easy to implement, secure and complete erase functions

Solution

- 840V & 840L SSDs with 5-year longevity
- Software and firmware customization service for requested SMART format
- Built-in power failure protection including Guarantee Flush, Low Voltage Detections and Soft Start functions
- Secure Erase function triggered by GPIO or software

Industrial Manufacturing Quality & Rugged Plus Service

Conformal Coating
- Acrylics coating material - HumiSeal
- Conformability thickness : 0.03 ~ 0.13 mm
- Water, corrosion, acid, and base resistance

Sidefill
- Reliability enhancement option
- Shock, drop, and vibration resistant
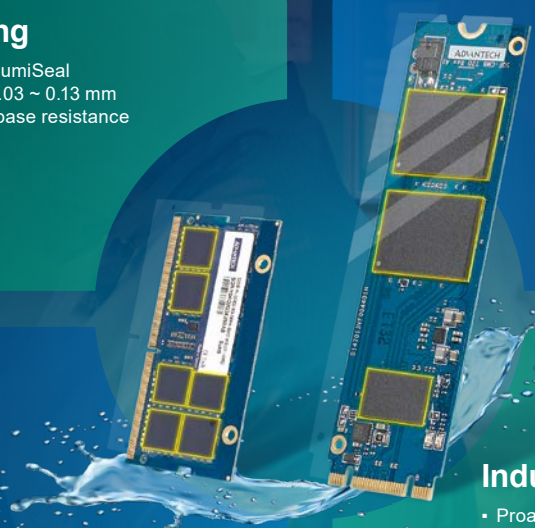- Improved product life and quality

Industrial Design
- Original IC selection
- Early access to controller technology
- EMI/ESD proved circuit design
- JEDEC standard compliance

Industrial Service
- Proactive design-in and after sales service
- Prompt and localized technical support
- Industrial business scale
- 30-days customization service

DeviceOn/SQ Manager

Step into an AIoT Future with the Intelligent PMQ Tools

Advantech's DeviceOn/SQ Manager software utility includes tools that enable real-time local and remote monitoring for SQFlash and SQRAM products. These utilities help manage security features, enhance maintenance efficiency and performance monitoring; and augment overall system stability.

1 **Real-Time Monitoring**
Easily survey speed and temperature

2 **Production Record**
Traceable production history included SN, date and flash P/E cycle

3 **Overheat Alert**
Overheat warning set up by different applications

4 **General Prediction**
SSD estimated lifetime prediction based on historical usage

5 **Endurance Estimation**
Use this program to estimate lifetime by while using our own test programs or patterns

6 **Remote Management**
Monitor device status and process dynamic data in real-time via a visualized dashboard

High-Performance Memory

For inspection equipment in semiconductor industry

Rugged Designed Memory

For outdoor AMR AI delivery robots

Requirements

Precision quality check test equipment in semiconductor industry. High-speed module with low latency and error correct function to ensure product quality in vision inspection machines.

Solution

- Error correct function support ensures reliable operation and quality of test equipment
- SQR DDR5 (ECC) pioneering product on the market
- Prompt technical support

Requirements

The automated mobile robots (AMR) market is growing rapidly and requires durable solutions for use in outdoor environments or on the road. Outdoor environments present challenges related to vacillating temperatures, vibration, and moisture.

Solution

- SQR-SD4I series support wide temperature -40 ~ 85 °C with 48hr high-low temperature burn-in test
- Strictly 100% vibration test with 3 mins 6G 20-500Hz
- Comprehensive perfection by conformal coating and sidefill to avoid water and dust problem

SQRAM Designed for Extreme Conditions

SQRAM comprises a comprehensive product line that includes various DIMM type rugged solutions for the IIoT market that support multiple temperature range solutions. All SQR memory are verified by different CPU family and Advantech platforms to ensure reliable compatibility.

Outdoor Kiosks

Telecom

Transportation

Automation

Aerospace / Defense

Medical

|	High Plus		Rugged Design	
	ECC DIMM	Server DIMM	Wide Temperature	
Product Series	SQR-SD5N (ECC)	SQR-RD5N	SQR-SD5I	SQR-SD4I
DDR	DDR5	DDR5	DDR5	DDR4
Dimm Type	SODIMM	RDIMM	SODIMM	SODIMM
Data Transfer Rate(MT/s)	4800	4800	4800	3200
Capacity	16/32 GB	16/32/64 GB	8/16/32 GB	4/8/16/32 GB
Voltage	1.1v	1.1v	1.1v	1.2v
Operating Temperature	0~95°C	0~95°C	-40~95°C	-40~85°C -40~125°C
Function	ECC	ECC register	-	-

Cost Effective Selection	
SQR-SD5N	SQR-SD4N
DDR5	DDR4
SODIMM	SODIMM
4800	3200
8/16/32GB	4/8/16/32GB
1.1v	1.2v
0~95°C	0~85°C
-	-

Reliable Operating Quality with Advanced Thermal Solution

Industrial Heatsink Design for Reliable Operation

0.5 mm pure aluminum body
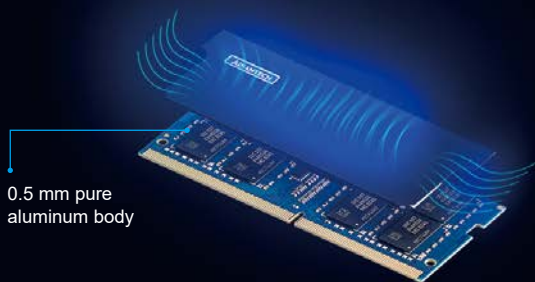
Physical Heatsink
Aluminum Heat Spreader

SQRAM solutions use a powerful aluminum heat spreader that enables high performance computing at the edge. This spreader transfers heat while cooling the device core and delivering optimum performance to diverse solutions.
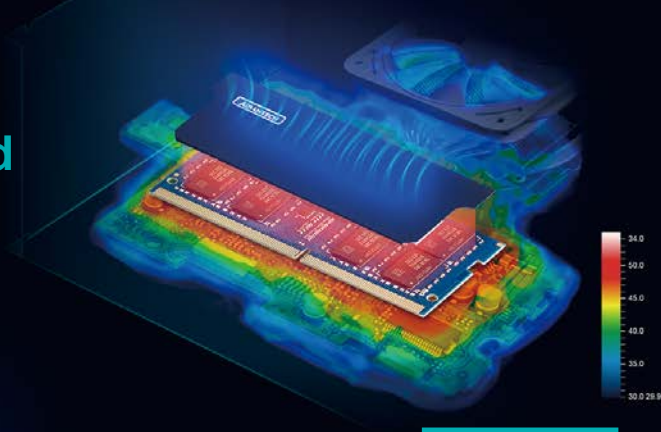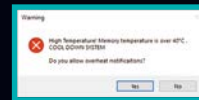
Software Monitoring
SQRAM Manager

SQRAM memory modules use EEPROM with thermal sensors to measure memory operating temperatures. DeviceOn/SQ Manager online software remote and conveys real-time data via a user-friendly interface — enabling users to monitor SQRAM memory modules efficiently.

Real-time Monitoring

Overheat Alert

Extreme Robust Design

Vibration & Shock Resistance

Mounting Hole Design

Locked DRAM on MB resists vibration

MIL-STD-810G
Mechanical Shock Tested

Innovative Rugged Design

Innovative design with mounting hole resist vibration in critical environments.

- Qualified by Military level Mechanical Shock Tested, MIL-810G
- Compliant JEDEC DDR4 standard pin definition
- -40 ~ 85 °C wide temperature support
- Extra service with underfill and conformal coating (optional)

MILITARY GRADE
MIL-STD
810G
CERTIFIED

Ultra-Wide Temperature

Breakthrough Temperature Ceilings

SQR-SD4E

SODIMM DDR4 3200

- Capacity: 8GB/16GB/32GB
- Operation Temperature support -40 ~ 125 °C
- Original Micron Automotive Grade IC
- Temperature monitoring tool
- Overheat alert support
- Underfill for better reliability

0°C

-40°C

100°C

125°C

Exclusive in industrial market with durable design to support high temperatures (125 °C)

SQRAM Innovative Design & Service

Ultra high Temp

-40 ~ 125 °C operating in extreme environment with automotive grade IC

Robust Design

Rugged DIMM with mounting hole MIL-810G certificate

Thermal solution

The most effective heatsink design for reliable operation

Why
SQRAM?

1

The best industrial memory total solution provider

SQR has passed a strict 24hr test program with a high-low temperature stress test. Likewise, SQR passed Military level mechanical testing to ensure solution reliability and stability; and provide a low defect rate.

2

Professional technical support

SQR has a dedicated technical team that helps customers address issues. This team provides a regional engineer who works with the HQ problem analysis center. In addition, DRAM IC vendor delivers strong back-end support to address issues as they arise.

3

Long-term supply

Longevity and access to stable supplies remain key factors for long-term projects in the industrial market. Accordingly, SQR ensures 3-years longevity using DRAM IC partner contracts committed to supply stability.
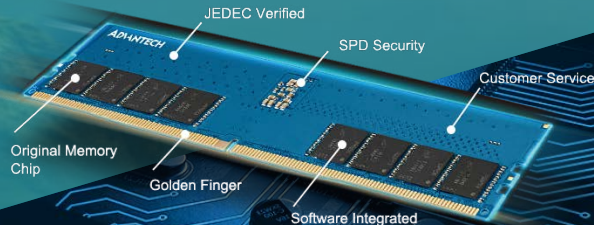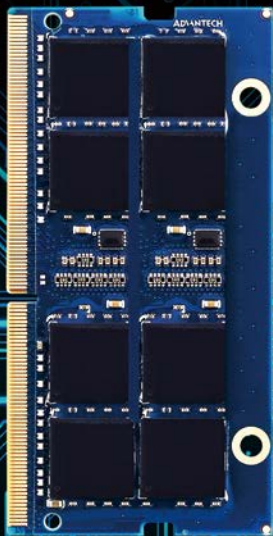
4

DRAM monitoring software

The unique SQR Manager tool delivers real-time DRAM operating information — including speed, temperature, and our exclusive overheat alert function.

JEDEC Verified

SPD Security

Customer Service

ADVANTECH

Original Memory Chip

Golden Finger

Software Integrated

SQRAM

**BREAKTHROUGH PERFORMANCE
INNOVATIVE RUGGED DESIGN**