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
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

**Pioneering Thermal Solution**
For NVMe SSDs
SQFlash has the industry's most comprehensive security functions — for mission-critical applications; and protecting data against viruses or hackers.

### Comprehensive Security Functions

- EFI & BIOS Integrated
- Tool – SQGuard
- Third-Party Integration
- Host

#### Application

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

#### SQFlash Device

- TCG-OPAL and TCG-Enterprise compliant
- Crypto Erase and Military Erase
- McAfee software integration
- TCG-OPAL and TCG-Enterprise compliant
- Crypto Erase & Military Erase Support
- TCG Opal Compliant
- FIPS 140-2 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.

- **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

**Additional thermal solution**

- Complete form factor selection
- 0~70 °C
- -20~85 °C
- -40~85 °C

**Designed for Diverse Applications**

- Transportation
- Automation
- Aerospace/Defense
- Data Center
- Gaming
- Medical
- Gaming
- Medical

**High Endurance & Reliable Performance**

**Cost Effective & High Capacity**
Ruggedized NVMe SSDs
For in-vehicle data logging systems

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.

Enterprise-Class SATA SSDs
For blood analyzers

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

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

Rugged Designed Memory
For outdoor AMR AI delivery robots

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 ℃ 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.

<table>
<thead>
<tr>
<th>Product Series</th>
<th>ECC DIMM</th>
<th>Server DIMM</th>
<th>Wide Temperature</th>
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<tr>
<td>DDR</td>
<td>DDR5</td>
<td>DDR5</td>
<td>DDR5</td>
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<tr>
<td>Dimm Type</td>
<td>SODIMM</td>
<td>RDIMM</td>
<td>SODIMM</td>
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<tr>
<td>Data Transfer Rate(MT/s)</td>
<td>4800</td>
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<tr>
<td>Capacity</td>
<td>16/32 GB</td>
<td>16/32/64 GB</td>
<td>8/16/32 GB</td>
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<tr>
<td>Voltage</td>
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<td>1.1v</td>
<td>1.1v</td>
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<tr>
<td>Operating Temperature</td>
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<td>0~95°C</td>
<td>-40~95°C</td>
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<td>Function</td>
<td>ECC</td>
<td>ECC register</td>
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**Cost Effective Selection**

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<th>SQR-SD5N</th>
<th>SQR-SD4N</th>
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<tr>
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<tr>
<td>Operating Temperature</td>
<td>0~95°C</td>
<td>0~85°C</td>
</tr>
</tbody>
</table>
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

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)

Mounting Hole Design
Locked DRAM on MB resists vibration
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

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.
SQRAM

BREAKTHROUGH PERFORMANCE
INNOVATIVE RUGGED DESIGN