

# Industrial Storage Modules

SQFlash- Secure & Smart Flash Management

- ／ PATA Series
- ／ SATA Series
- ／ SATA Extreme Series
- ／ PCI Express
- ／ USB & SD Card



**ADVANTECH** EmbCore

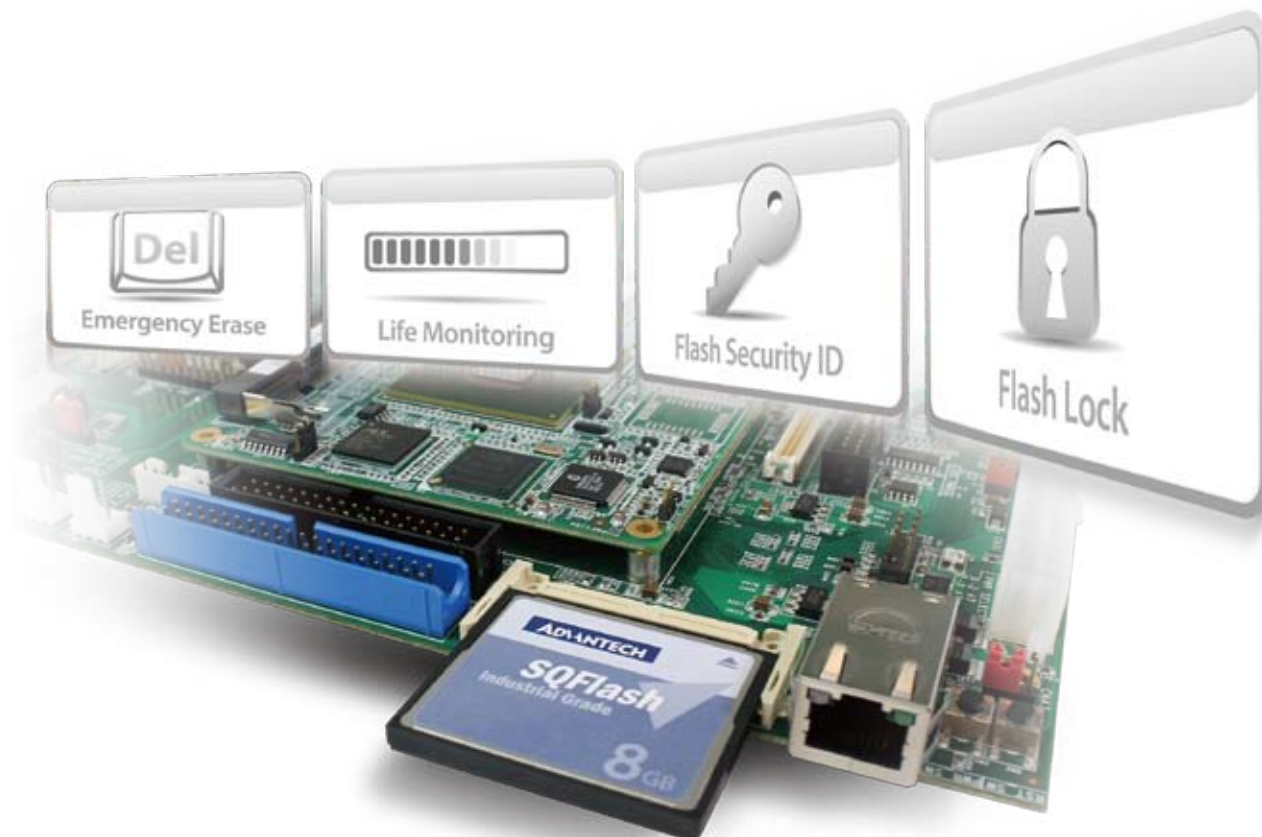
# About SQFlash

SQFlash are a full range of flash storage products which are available in different interfaces such as: Disk-on-Module (DOM), Flash Card, or Solid State Drive (SSD) with PATA, SATA and even native PCI express transfer protocols. We are committed to product longevity and fixed specification support for up to 3 years as your industrial design-in partner of choice.

Advantech SQFlash was verified with all Advantech platforms and fully tested in rugged environments to ensure its high compatibility and reliability. In order to keep data integrity and extend flash lifespans, protection mechanisms such as Power Failure Protection and Global Wear-leveling algorithms were implemented to the entire product series. The end user can access information about their flash memory through the SQFlash Utility software package to make ensure their system is healthy and functioning at its optimum performance.

SQFlash Utility software package was developed by Advantech to deliver an assortment of unique and value-added software functions. Besides flash health and life monitoring, it also comes with advanced security functions. Flash Security ID is a security function that helps protect Intellectual property and valuable data. The Flash Lock utility locks the SQFlash to a corresponding platform so it cannot be accessed by any other platforms, and the latest Emergency Erase function can quickly and deeply wipe the drive, including control firmware at any critical moment.

Advantech SQFlash was designed with industrial operation in mind and provides highly reliable flash memory solutions with excellent compatibility, performance and security. Designing your application with SQFlash will decrease integration effort significantly and increase overall system stability.



# Storage Solutions



Model Name	SQF-P10	SQF-PDM	SQF-P25	SQF-S10	SQF-SDM	SQF-SLM	SQF-S25
<b>Interface</b>	IDE / PCMCIA	IDE	IDE	SATA	SATA	SATA	SATA
<b>Transfer Protocol</b>	PIO Mode-6 MwDMA Mode-2 UDMA Mode-5	PIO Mode-4 MwDMA Mode-2 UDMA Mode-4	PIO Mode-4 MwDMA Mode-2 UDMA Mode-4	SATA II (3.0G)	SATA II (3.0G)	SATA II (3.0G)	SATA II (3.0G)
<b>Connector Type</b>	CF Type-I	40-pin 2.54mm pitch / 44-pin 2.0mm pitch Receptacle Housing Connector	44-pin 2.0mm pitch Receptacle Housing Connector	CFast Type-I	7pin Female SATA Connector, optional Vcc@Pin7	Standard 7+15 pin SATA Connector	Standard 7+15 pin SATA Connector
<b>Flash Type</b>	SLC	SLC	SLC	SLC	SLC	SLC	SLC
<b>Capacity</b>	256MB and 1/2/4/8/16/32 GB	2/4/8/16 GB	SLC: 4/8/16/32/64 GB MLC: 8/16/32/64/128 GB	SLC: 2/4/8/16 GB	2/4/8/16/32 GB	SLC: 2/4/8/16 GB	4 channel: 95/50 MB/s
<b>Performance</b>	4 channel: 83/87 MB/s 2 channel: 43/40 MB/s 1 channel: 22/15 MB/s	2 channel: 40/29 MB/s	SLC: 4 channel: 65/55 MB/s MLC: 4 channel: 63/28 MB/s	4 channel: 95/50 MB/s 2 channel: 45/25 MB/s	4 channel: 95/50 MB/s 2 channel: 45/25 MB/s	4 channel: 95/50 MB/s 2 channel: 45/25 MB/s	4 channel: 95/50 MB/s
<b>Operating Temp</b>	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)
<b>Environmental Regulation</b>	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant
<b>Software Add-on Features</b>							
<b>Security ID</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Life Monitoring</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Flash Lock</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes



Model Name	SQF-S10 Extreme	SQF-SLM (Extreme)	SQF-S25 Extreme	SQF-PCM	SQF-UDM	SQF-ISD
<b>Interface</b>	SATA	SATA	SATA	Mini PCIe	USB	SD
<b>Transfer Protocol</b>	SATA II (3.0G)	SATA II (3.0G)	SATA II (3.0G)	PCI express Gen. 2	USB 2.0, downward compatible with 1.1	SD 2.0
<b>Connector Type</b>	CFast Type-I	Standard 7+15 pin SATA Connector	Standard 7+15 pin SATA Connector	Standard Mini PCIe	10-pin 2.54mm pitch Receptacle Housing Connector	Standard 9pin SD Connector
<b>Flash Type</b>	SLC / MLC	SLC / MLC	SLC / MLC	SLC / MLC	SLC	SLC
<b>Capacity</b>	SLC: 4/8/16 GB MLC: 8/16/32/64 GB	SLC: 4/8/16/32 GB MLC: 4/8/16/32/64 GB	SLC 8 channel: 250 / 210 MLC 8 channel: 230 / 210	SLC:16/32/64 GB MLC:32/64/128 GB	1/2/4/8 GB	SDC: 1GB, 2GB SDHC: 4GB, 8GB
<b>Performance</b>	SLC: 105/90 MB/s MLC: 95/30 MB/s	SLC 4 channel: 145/100, up to 210/175 MLC 4 channel: 135/90, up to 200/175	SLC 8 channel: 250 / 210 MLC 8 channel: 230 / 210	SLC 4 channel:300/150 MLC 4 channel:300/80	32/26 MB/s	25/12.5 MB/s
<b>Operating Temp</b>	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0~70°C (Commercial) -40~85°C (Industrial)	0 ~ 70° C (Commercial)	0~70°C (Commercial)	-25~85°C (Industrial)
<b>Environmental Regulation</b>	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant	RoHS Compliant
<b>Software Add-on Features</b>						
<b>Security ID</b>	Yes	Yes	Yes	No	No	No
<b>Life Monitoring</b>	Yes	Yes	Yes	No	No	No
<b>Flash Lock</b>	Yes	Yes	Yes	No	No	No

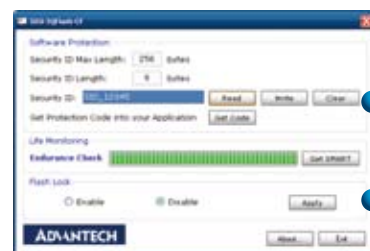
# SQFlash Software Package

- Fully Integrated with Your System

SQFlash Utility is a software package developed by Advantech that provides a friendly GUI for users to manage SQFlash modules. Because the API is also available, customers can embed the complete functionality of the SQFlash Utility into their own applications. This is also the reason that SQFlash can be deeply integrated with both hardware platform and software application. With our SQFlash Utility, the health of your SQFlash can be monitored and advanced security functions can be implemented to make a truly reliable system.

## Flash Security ID

Emergency Erase was implemented from the ATA command – Secure Erase. The command is designed to quickly erase all blocks of SQFlash, including controller firmware. Once the command has been executed, the controller firmware and logical block mapping table will be wiped clean and the SQFlash will become unusable with no way to recover any data.



## Flash Lock

Flash Lock is established between SQFlash and the BIOS of the motherboard. Once the SQFlash is locked with a specific platform, it is no longer accessible with any other platforms or any forms of card reader, unless the SQFlash is unlocked again with the original platform.



## Emergency Erase

Emergency Erase was implemented from the ATA command – Secure Erase. The command is designed to quickly erase all blocks of SQFlash, including controller firmware. Once the command has been executed, the controller firmware and logical block mapping table will be wiped clean and the SQFlash will become unusable with no way to recover any data.



## Life Monitoring

Life Monitoring is an endurance check mechanism based on the ATA S.M.A.R.T. command which provides Flash lifespan estimation information including:

- **Endurance Check**  
Estimated remaining life % as a result of (Average Program) / (Max Program)
- **Max Program**  
Max program and erase cycle
- **Average Program**  
Average program and erase cycle
- **Power On Time**  
Power-on accumulated time
- **ECC Count**  
Error correct code counts



# PATA Series

## SQF-P10 Industrial CompactFlash



### Features

- Compliant with CFA 3.0 specification
- Built-in EDC/ECC up to 12 random bits error per 512 bytes
- Advanced wear-leveling and block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech's SQFlash CompactFlash card is one of the best choices in the memory card market, offering excellent industrial grade performance in various capacities. This CompactFlash card is fully solid state and does not require any additional mechanical parts, it is fully vibration resistant and offers extremely low power consumption. This SQFlash CompactFlash card is one of the most popular cards today based on its high performance, good reliability and wide compatibility.

### Specification:

Model Name	SQF-P10
Connector Type	SQF-P10
Flash type	SLC (42nm)
Capacity	256MB, 1GB to 32GB
Transfer Mode	PIO Mode 6 / Multi Word DMA Mode 2 / Ultra DMA Mode 5
Max. Sustained R/W, Performance (MB/sec)	4 channel: 83 / 87, 2 channel: 43 / 40; 1 channel: 22 / 15
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms ; Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 6,000,000 hours
Dimensions (mm)	36.4 x 42.8 x 3.3
Environmental Regulation	RoHS Compliant

## SQF-P25 2.5" PATA Flash Drive



### Features

- Selectable Master/Slave Setting
- Built-in EDC/ECC up to 12 random bits error per 512 bytes
- Advanced wear-leveling and block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQFlash 2.5" PATA-SSD (Solid State Drive) is a non-volatile, solid state data storage system. Due to rapid production of flash media, Solid State Drives have become the most popular storage media to replace conventional Hard Disk Drives. Free of any mechanical components, 2.5" PATA-SSD provides a more robust and cost effective storage solution for embedded applications. Offering standard ATA interface, which is fully compatible with traditional HDD, 2.5" PATA-SSD offers the designer an easy solution to integrate in PC-based systems. Advantech SQFlash 2.5" PATA-SSD is one of the most popular cards today based on its high performance, good reliability and wide compatibility.

### Specification:

Model Name	SQF-P25
Connector Type	44-pin 2.0mm pitch receptacle housing connector
Flash type	SLC / MLC
Capacity	SLC: 4 GB to 64 GB, MLC: 8 GB to 128 GB
Transfer Mode	PIO Mode 4 / Multi Word DMA Mode2 / Ultra DMA Mode 4
Max. Sustained R/W, Performance (MB/sec)	SLC: 4 channel: 65/ 55, MLC: 4 channel: 63/28
Operating Temp	0~70°C (Normal), -40~85°C (Industrial)
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	100 x 69.85 x 7.2
Environmental Regulation	RoHS Compliant

## SQF-PDM PATA Disk Module



### Features

- Standard 40-pin / 44-pin IDE female connector
- Selectable master/slave setting
- Built-in EDC/ECC up to 12 random bits error per 512 bytes
- Advanced wear-leveling and block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQFlash SQF-PDM (PATA Disk Module) is a non-volatile, solid state data storage disk module. Given the advantages of lower power consumption - more rugged, no noise, higher MTBF and other features, SQF-PDM is gradually becoming a mainstream choice to replace conventional Hard Disk Drives. Free of any mechanical components, SQF-PDM provides a more robust and cost effective storage solution for any kind of embedded application. Offering standard ATA interface, which is fully compatible with traditional HDD, SQF-PDM offers designers an easy solution to integrate in PC-based systems.

### Specification:

Model Name	SQF-PDM
Connector Type	40-pin 2.54mm pitch / 44-pin 2.0mm pitch receptacle housing connector
Flash type	SLC
Capacity	1 GB to 16 GB
Transfer Mode	PIO Mode 4 / Multi Word DMA Mode2 / Ultra DMA Mode 4
Max. Sustained R/W, Performance (MB/sec)	2 channel: 40/29
Operating Temp	0~70°C (Normal), -40~85°C (Industrial)
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 4,000,000 hours
Insertions	RoHS Compliant



# SATA Series

## SQF-S10 Industrial CFast Card



### Features

- Compliant with standard CFast card Type 1 specifications
- Protocol: SATA Gen 2
- Built-in ECC corrects up to 15-bit random bits error per 512 bytes
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

CFast is a small form factor flash memory card that complies with CFA standard. The CFast card provides higher performance than traditional CF cards and electrically complies with the Serial ATA International Organization standard. The card's 7+17-pin connector consists of a SATA-compatible 7-pin signal connector and a 17-pin power and control connector. The controller interfaces with the host system allowing data to be written to and read from the flash memory.

### Specification:

Model Name	SQF-S10
Connector Type	CFast Type-1
Flash type	SLC
Capacity	2GB to 16GB
Transfer Mode	SATA Gen2
Max. Sustained R/W Performance (MB/sec)	4 channel: 95 / 50, 2 channel: 45 / 25
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	36.4 x 42.8 x 3.3
Environmental Regulation	RoHS Compliant

## SQF-SDM SATA Disk Module



### Features

- Standard on-board SATA 7-pin female connector
- Protocol: SATA Gen 2
- Extra hook type available for mechanical connection enhancement
- Dedicated SATA socket for hook type model available as well as extension cables.
- Built-in ECC corrects up to 15-bit random bits error per 512 bytes
- Global wear-leveling and bad block management
- SQFlash Utility software package

Advantech's SQFlash SQF-SDM (SATA DOM) is the SATA Flash module with smallest form factor that also offers excellent industrial grade performance and high reliability in various capacities. SQF-SDM is designed with standard onboard 7-pin SATA socket for direct mounting without other mechanical assistance. This model also features an optional hook type connector to boost mechanical stability even more.

### Specification:

Model Name	SQF-SDM
Connector Type	Standard SATA 7-pin female connector
Flash type	SLC
Capacity	2GB to 32GB
Transfer Mode	SATA Gen 2
Max. Sustained R/W Performance (MB/sec)	4 channel: 95 / 50, 2 channel: 45 / 25
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5%~95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 3,000,000 hours
Dimension (mm)	2GB to 16GB: 39.4 x 25 x 6.5, 32GB: 39.4 x 25 x 9.3
Environmental Regulation	RoHS Compliant

## SQF-SLM Half-Slim SATA Module



### Features

- Compliant with JEDEC MO-297 specification
- Protocol: SATA Gen 2
- Built-in ECC corrects up to 15-bit random bits error per 512 bytes
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQFlash SQF-SLM (Half-Slim) is compatible with mainstream storage compartment dimensions. Benefitting from low power consumption, high performance and slim appearance with more rugged design, SQF-SLM is specifically suitable for small form factor systems.

### Specification:

Model Name	SQF-SLM
Connector Type	Standard 7+15pin SATA connector
Flash type	SLC
Capacity	2GB to 16GB
Transfer Mode	SATA Gen 2
Max. Sustained R/W Performance (MB/sec)	4 channel: 95 / 50, 2 channel: 45 / 25
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms; Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	54 x 39 x 4.5
Environmental Regulation	RoHS Compliant

## SQF-S25 2.5" SATA Flash Drive



### Features

- Compliant with SATA II and SATA v2.6 standard
- Protocol: SATA Gen 2
- Built-in ECC corrects up to 15-bit random bits error per 512 bytes
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQFlash 2.5" SATA-SSD (Solid State Drive) provides high stability, low power consumption and quiet operation. SQF-S25 is more rugged, reliable and power-efficient compared to regular mechanical hard drives. With no moving parts, SQF-S25 is designed for use in all kinds of industrial applications. It is the best drop-in replacement for high maintenance HDDs where reliability is a major concern.

### Specification:

Model Name	SQF-S25
Connector Type	Standard 7+15pin SATA connector
Flash type	SLC
Capacity	8GB to 32GB
Transfer Mode	SATA Gen 2
Max. Sustained R/W Performance (MB/sec)	4 channel: 95 / 50
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C,
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5%~95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	100.20 x 69.85 x 9.50
Environmental Regulation	RoHS Compliant

# SATA Extreme Series

SATA Extreme series is a brand new product segmentation of SQFlash which provides higher capacity and focuses on extremely high transfer speeds for performance-oriented applications. SQF-SLM and SQF-S25 Extreme were designed with DRAM cache structures so both sequential and random access are improved significantly. Also, these two models support an IM function to ensure steady high performance and prolong their lifespans further.

## TRIM

TRIM command allows an operating system to inform an SSD which blocks of data are no longer considered in use and can be wiped internally. Delete operations are typically limited to flagging data blocks as "not in use" in the file system, that means the operating system should perform an overwrite operation later to those blocks which have been considered as free space. For traditional hard disks this is no different than writing to an empty sector. But for an SSD, an overwrite produces significant overhead which degrades read/write performance. TRIM enables the SSD to handle overheads in advance to prevent noticeable slow down in future read/write operations.



# SQF-S10 Extreme Industrial CFast Card



## Features

- Compliant with standard CFast card Type 1 specifications
- Protocol: SATA Gen 2
- Built-in ECC corrects up to 15-bit random bits error per 512 bytes
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

CFast is a small form factor flash memory card that complies with the CFA standard. The CFast card provides higher performance than traditional CF cards and electrically complies with the Serial ATA International Organization standard. The card's 7+17-pin connector consists of a SATA-compatible 7-pin signal connector and a 17-pin power and control connector. The controller interfaces with a host system allowing data to be written to and read from the flash memory.

## Specification:

Model Name	SQF-S10 Extreme
Connector Type	CFast Type-1
Flash type	SLC/MLC
Capacity	4GB to 64GB
Transfer Mode	SATA Gen2
Max. Sustained R/W Performance (MB/sec)	SLC: 105 / 90, MLC: 95 / 30
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 1,000,000 hours
Dimensions (mm)	36.4 x 42.8 x 3.3
Environmental Regulation	RoHS Compliant

# SQF-SLM Extreme Half-Slim SATA Module



## Features

- Compliant with JEDEC MO-297 specification
- Protocol: SATA Gen 2
- Supports 48/32/28 bit ECC correct per 2K Byte data
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQFlash SQF-SLM Extreme is compatible with mainstream storage compartment dimensions. Benefiting from 64MB DRAM cache the data transfer rate is boosted. High capacity models can even reach up to 200 MB/s for reading. This extreme version of SATA Slim is suitable for applications which require high performance but with limited mechanical size.

## Specification:

Model Name	SQF-SLM Extreme
Connector Type	Standard 7+15pin SATA connector
Flash type	SLC/MLC
Capacity	SLC: 4GB to 32GB, MLC: 4GB to 64GB
Transfer Mode	SATA Gen 2
Max. Sustained R/W, Performance (MB/sec)	SLC 4 channel: 145/100, up to 210/175, MLC 4 channel: 135/90, up to 200/175
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms; Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	54 x 39 x 4.5
Environmental Regulation	RoHS Compliant

# SQF-S25 Extreme 2.5" SATA Flash Drive



## Features

- Compliant with SATA II and SATA v2.6 standard
- Protocol: SATA Gen 2
- Supports 48/32/28 bit ECC correct per 2K Byte data
- Global wear-leveling and bad block management
- Shock resistance, anti-vibration and low power consumption
- SQFlash Utility software package

Advantech SQF-S25 Extreme focuses on providing SATA Gen 2 SSD for applications that require high sequential read / write rates. It has 64 MB DRAM cache to help speed up data processing so that it could achieve more than 200 MBs sequential processing rates for both read and write. The mechanism can also distribute data evenly amongst flash blocks and reduce unnecessary flash read / writes in advance.

## Specification:

Model Name	SQF-S25 Extreme
Connector Type	Standard 7+15pin SATA connector
Flash type	SLC/MLC
Capacity	SLC: 8GB to 128GB, MLC: 32GB to 512GB
Transfer Mode	SATA Gen 2
Max. Sustained R/W Performance (MB/sec)	SLC 8 channel: 250 / 210, MLC 8 channel: 230 / 210
Operating Temp	Standard Grade: 0 ~ 70°C, Industrial Grade: -40 ~ 85°C,
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5%~95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	100.20 x 69.85 x 9.50
Environmental Regulation	RoHS Compliant

# PCI Express

Advantech SQFlash PCM is a Mini PCIe storage module. Unlike the popular mSATA module, which actually operates with the SATA protocol, SQF-PCM uses the native PCI express transfer protocol to access NAND Flash directly and is fully compatible with the standard Mini PCIe form factor. With the wide BUS bandwidth of PCI express, these storage modules provide high IOPS for both read and write operations. This model is especially beneficial for frequent data processing.

## IOPS

IOPS is an abbreviation for "Input / Output Operations Per Second", which is a benchmark for random access in storage devices. It is a measurement of processing (control IC of SSD) capability. IOPS can significantly affect the overall performance of the Operating system (OS) if most of the blocks are fragmented small files, and the OS needs to work harder to access all the empty blocks until data can be re-written in large blocks.

	PATA Interface	PCIe Interface	Δ
IOPS @4KB Write	6	4500	750 times faster



# SQF-PCM Mini PCIe Disk Module



## Features

- Native PCI express transfer protocol without bridging
- Compliant with PCI express Gen 2
- High random access performance
- Shock resistance, anti-vibration and low power consumption

Advantech SQFlash SQF-PCM is a mini storage module operating with native PCI express transfer protocol and fully compatible with standard mini PCIe form factor. With the wide BUS bandwidth of PCI express, the storage module provides high IOPS for both read and write. This model is especially beneficial for frequent data processing.

## Specification:

Model Name	SQF-PCM
Connector Type	Standard Mini PCIe
Flash type	SLC / MLC
Capacity	SLC: 16GB to 64GB, MLC: 32GB to 128GB
Transfer Mode	PCI express Gen 2
Max. Sustained R/W Performance (MB/sec)	SLC 4 channel: 300 / 150, MLC 4 channel: 300 / 80
IOPS @ 4KB R/W	SLC: 6000 / 4500, MLC: 6000 / 2500
Operating Temp	0 ~ 70°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms, Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 2,000,000 hours
Dimensions (mm)	30 x 50.95 x 3.4
Environmental Regulation	RoHS Compliant

# USB & SD Card

## SQF-UDM USB Disk Module



## Features

- Compliant with standard USB specifications
- Built-in EDC/ECC up to 12 random bits error per 512 bytes
- Advanced wear-leveling and block management
- Shock resistance, anti-vibration and low power consumption

The Advantech SQFlash SQF-UDM (USB Disk Module) is based on a USB 2.0 controller which supports USB 2.0 & 1.1 and interface to NAND Flash Memory. This USB Disk Module is specially designed for motherboards and built into the PC / Notebook / IA system. SQFlash SQF-UDM solution reduces a lot of the design effort needed from R/D to production, as well as simplifying RMA problems. It supports a USB mass storage function and also supports a USB boot function from the BIOS. SQFlash SQF-UDM solution is not only easy to install, but also fast and easy to use.

## Specification:

Model Name	SQF-UDM
Connector Type	10-pin 2.54 mm pitch receptacle housing connector
Flash type	SLC
Capacity	1GB to 8GB
Transfer Mode	USB 2.0
Max. Sustained R/W, Performance (MB/sec)	30 / 20
Operating Temp	Standard Grade: 0 ~ 70°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms; Vibration: 20G, Peak / 80~2000Hz
Humidity	5% ~ 95%
Endurance	> 5,000,000 program/erase cycles
MTBF	> 1,600,000 hours
Dimensions (mm)	26.5 x 37.8 x 1.6 (PCB Size)
Environmental Regulation	RoHS Compliant

# SQF-ISD Industrial SD Card



## Features

- SLC NAND Flash and wide range temperature support
- Compliant with SD system specification version 2.0
- Write protection feature using mechanical switch
- Shock resistant, anti-vibration and low power consumption

Advantech SQF-ISD provides industrial grade SD card in both SD standard capacity and SDHC. With the implementation of SLC NAND flash, this flash module provides relatively high speeds in SD form factor, and also supports wide temperature operation for industrial environments.

## Specification:

Model Name	SQF-ISD
Connector Type	Standard 9-pin SD Card
Flash type	SLC
Capacity	SDC: 1GB, 2GB, SDHC: 4GB, 8GB
Transfer Mode	SD specification 2.0
Max. Sustained R/W Performance (MB/sec)	25 / 12.5
Operating Temp	Industrial Grade: -25 ~ 85°C
Mechanical Specification	Shock: 1,500G, Peak / 0.5ms; Vibration: 20G, Peak / 80~2000Hz
Humidity	5%~95%
Endurance	> 2,000,000 program/erase cycles
MTBF	> 3,600,000 hours
Dimension (mm)	32 x 24 x 2.1
Environmental Regulation	RoHS Compliant

# Industrial Flash Module with Security ID for POS System

## Introduction

Point-of-sale systems were first used in the retail industry as a way to speed up customer transactions. When products or services are sold, the sell price, quantity and trading details are transferred to a back-end system via front-end facilities that typically include a computer, monitor, cash drawer, receipt printer, barcode scanner, and credit card processing device. As they increase in popularity, POS systems are being designed to handle more and more functions, from sales and returns, to customer spending statistics and analysis. This helps retailers more easily manage their daily business as well as providing valuable customer shopping trends and purchasing data.

## Application Requirement

POS hardware development has matured over the years, and now the main focus has switched to POS software. The POS industry has developed different kinds of software to fulfill a broad variety of market demands, and with this development has come the need for better software protection. One customer tried KeyPro to protect their application. KeyPro is a USB flash disk that contains a software security key inside. The customer's application needed only to configure the KeyPro API in order to create a security key that protects valuable IP and data.

## Solutions

After evaluating the market, the customer ultimately chose Advantech's Industrial Flash Storage—SQFlash with Security ID technology—which provides a secure mechanism to protect applications without the need for extra parts or cost, and comes with a user friendly user interface. They also chose Advantech's AIMB-562 Kiosk motherboard to complete their total solution. By using Advantech's Security ID technology, the customer's POS application is fully protected and can only be executed in conjunction with the SQFlash module, providing ultimate data security. Advantech not only provides various kinds of boards with different form factors, but also provides software services and peripheral modules. This helps customers integrate their systems better and adds value to their applications.

## Benefits

- ▶ No extra cost or parts, and comes with a user-friendly software interface
- ▶ SQFlash comes with a 3-year lifespan and fixed specification support
- ▶ Provides the ultimate in intellectual property protection
- ▶ Integrated services from boards to software and modules

**If your valuable application ever gets stolen from SQFlash...**

It cannot be copied since it has Security ID protection.



# Industrial Flash Modules Secure Gaming Applications

## Features include:

In the United States, the legal gambling industry comprises about 500 casinos and hotels, with a total annual revenue of around \$90 billion. People go to Las Vegas or Atlantic City for entertainment and fun, visiting many different kinds of casinos. The casinos offer various types of games, such as video poker, blackjack, baccarat, roulette and many others, but the most popular game is still the slot machine. On average, each casino pays around US\$20 million in taxes annually. The gaming industry helps drive local economies and has become an important source of income for government as well.

## Application Requirement

Because of the huge profits generated, competition is fierce and every casino tries to improve and update their facilities to attract and keep customers coming in the doors, so gaming machine design has become a major focus of attention. One of Advantech's gaming industry customers found that after placing their machines in one of the largest casinos, a data drive was stolen by a competitor, who copied and reproduced their intellectual property and applications. Needless to say, this caused a significant loss to the original company and forced them to think seriously about security and how to protect their gaming machines from unscrupulous competitors in the gambling world.

## Solutions

Suffering from serious damage to its profits, this gaming industry player was eager to find a security solution that would protect its applications. They researched the marketplace and chose Advantech's Industrial Flash Storage—SQFlash with Flash Lock, and an AIMB-212 motherboard. Flash Lock disables and secures the entire SQFlash contents as soon as the power goes off, and it cannot be booted or read by any other platform or USB card reader. The only way to read the locked SQFlash is to boot from a corresponding platform that has the matching password and unlock mechanism. This feature protected the customer's important assets, freeing them from worry and allowing them to focus on the development of entertaining gaming content. Advantech provides integrated products and services—from boards, to software, to modules. These total solutions not only provide convenient, one-stop shopping, but also lead to enhanced devices and products.

## Benefits

- ▶ Fixed specification support and 3-year longevity for SQFlash
- ▶ Worry-free protection for intellectual property
- ▶ SQFlash available to suit every kind of motherboard
- ▶ One-stop shopping assures both time and cost efficiency

**If an SQFlash got stolen...**

It cannot be read by any card reader or other platforms without the unlock key.



## Regional Service & Customization Centers

<b>China</b>	Kunshan 86-512-5777-5666	<b>Taiwan</b>	Taipei 886-2-2792-7818	<b>Netherlands</b>	Eindhoven 31-40-267-7000	<b>Poland</b>	Warsaw 48-22-33-23-730	<b>USA</b>	Milpitas, CA 1-408-519-3800
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## Worldwide Offices

Greater China		Asia Pacific		Europe		Americas	
<b>China</b>	800-810-0345	<b>Japan</b>		<b>Germany</b>		<b>North America</b>	
Beijing	86-10-6298-4346	ePlatform	0800-500-1055	ePlatform	00800-2426-8080	ePlatform	1-800-866-6008
Shanghai	86-21-3632-1616	eAutomation	0800-500-1077	eAutomation	00800-2426-8081	eAutomation	1-800-205-7940
Shenzhen	86-755-8212-4222	Tokyo	81-3-5212-5789	München (ePlatform)	49-89-12599-0	Cincinnati, OH (eAutomation)	1-513-742-8895
Chengdu	86-28-8545-0198	Osaka	81-6-6267-1887	Düsseldorf (eAutomation)	49-211-97477-310	Irvine, CA (ePlatform)	1-800-557-6813 1-949-789-7178
Hong Kong	852-2720-5118						
<b>Taiwan</b>		<b>Korea</b>	080-363-9494	<b>France</b>		<b>Milpitas, CA</b>	
ePlatform	0800-777-111	Seoul	82-2-3663-9494	Paris (ePlatform)	33-1-4119-4666	Digital Signage	1-888-576-9668
eAutomation	0800-55-77-99	<b>Singapore</b>		Grenoble (eAutomation)	33-4-7670-4700	eAutomation	1-408-519-3898
Taipei	886-2-2792-7818	Singapore	65-6442-1000				
Taichung	886-4-2378-6250	<b>Malaysia</b>	1800-88-1809	<b>Italy</b>		<b>Brazil</b>	0800-770-5355
Kaohsiung	886-7-229-3600	Kuala Lumpur	6-03-7724-3555	Milano	39-02-9544-961	São Paulo	55-11-5592-5355
		Penang	60-4-397-3788 60-4-397-4188	<b>Benelux &amp; Nordic</b>			
				Breda (ePlatform)	31-76-5233100		
		<b>India</b>	1800-425-5070	Roosendaal (eAutomation)	31-165-550-505		
		Bangalore	91-80-2337-4567				
		<b>Australia</b>	1300-308-531	<b>United Kingdom</b>			
		Melbourne (ePlatform)	61-3-9797-0100	Ascot (ePlatform)	44-1344-878-400		
		Melbourne (eAutomation)	1300-308-531				
		Sydney (ePlatform)	61-2-9482-2443	<b>Russia</b>	8-800-555-01-50		
		Sydney (eAutomation)	1300-308-531	Moscow (ePlatform)	7-495-232-1692		
		<b>Thailand</b>					
		Bangkok	66-2-248-3140				