HAGIWARA Solutions

Storage Catalog

Vol.11

HAGIWARA Solutions

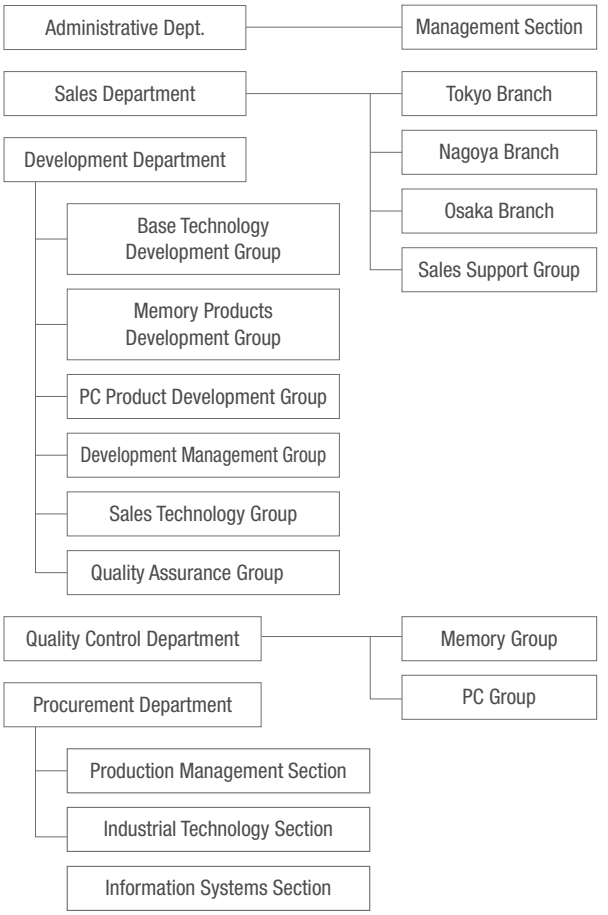
Supporting social infrastructure with high reliability industrial computing and storage products designed in pursuit of long-term stable operation of industrial equipment and systems.

Company Profile

Company name	Hagiwara Solutions Co., Ltd.
Head office	8th Floor, Pacific Square Nagoya Nishiki, 2-5-12 Nishiki, Naka Ward, Nagoya 460-0003
Established	July 4, 2011
Capital	50,000,000 yen
Representative	President and CEO: Junji Hada
Number of employees	97 (including contract and part-time employees) (As of May 2018)
Closing month	March

Hagiwara Solutions has a track record spanning over twenty years as a trailblazer in the manufacture of flash storage for industrial equipment.
Our strength is our high level of reliability backed by our knowhow and achievements so far, and the powerful support of our customers.

Organization Chart



Key Features

1 Technology development capabilities

Our long years of experience and knowhow combine with our advanced development capabilities to realize storage products able to support long-term stable operation of industrial equipment.

2 In-company developed firmware

Our in-company development of firmware allows us to build storage products optimized for industrial equipment.
We can also rapidly respond to trouble when failures occur.

3 Product testing

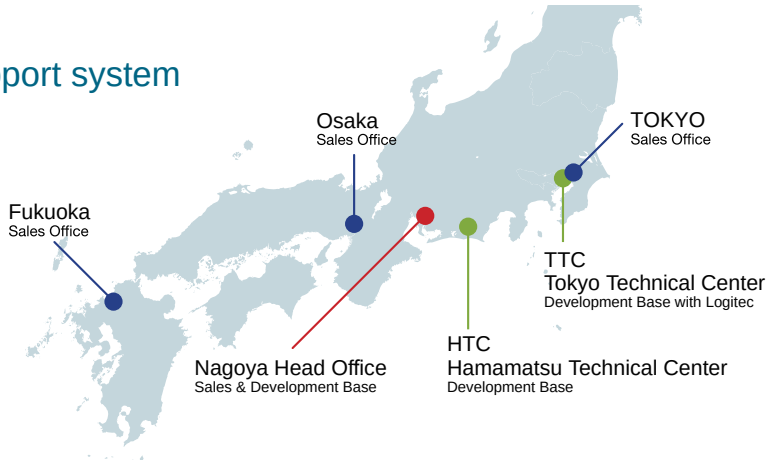
Our thorough testing, using the many testing devices of the Elecom Group, assures quality, performance, and reliability fit to meet severe conditions.

4 Commitment to quality

We maintain a high level of quality with shipment inspections and quality control backed up by solid experience and knowhow. Pre-shipment burn-in testing greatly contributes to minimizing the percentage of initial defects.

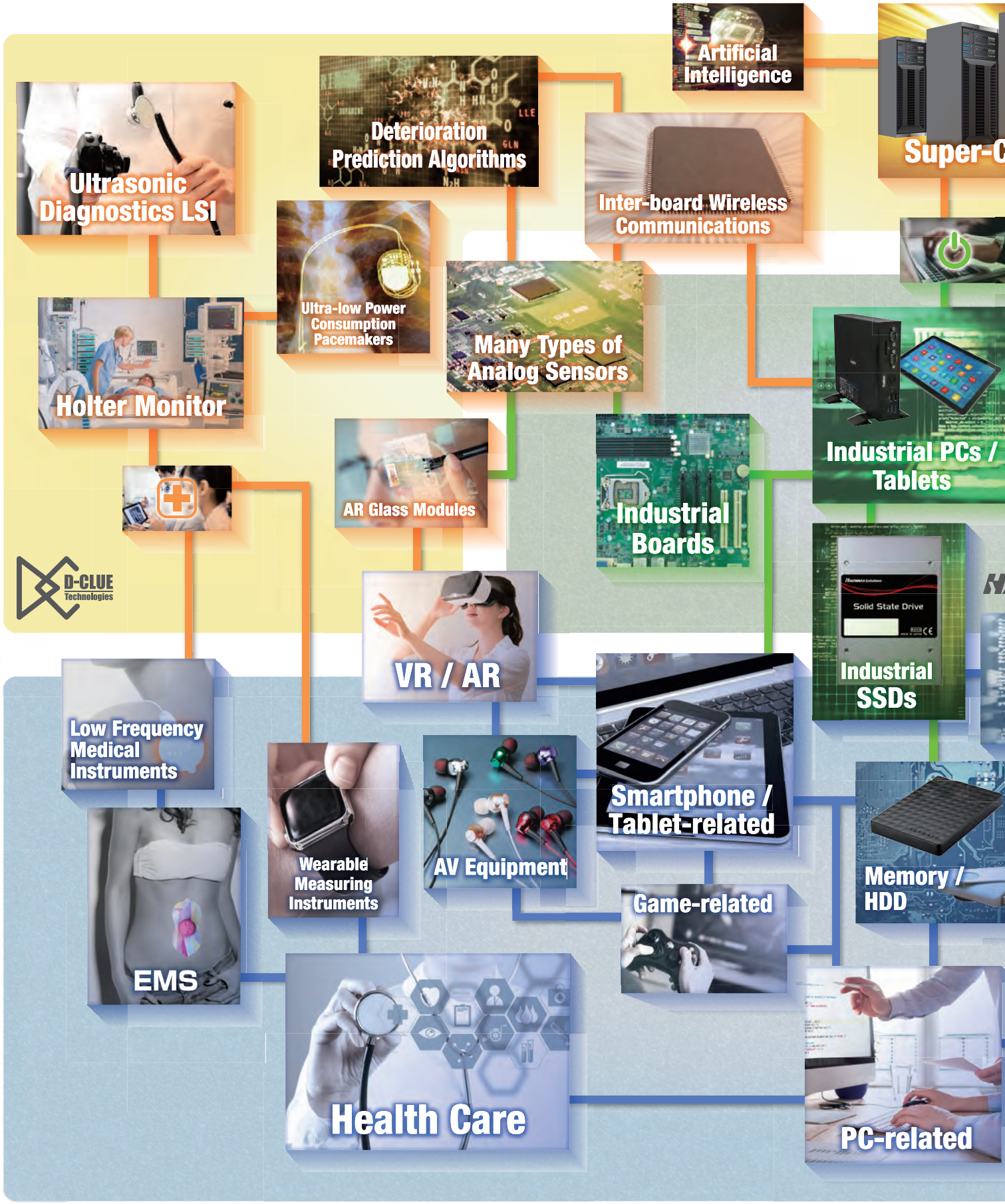
5 Peace-of-mind technical support system

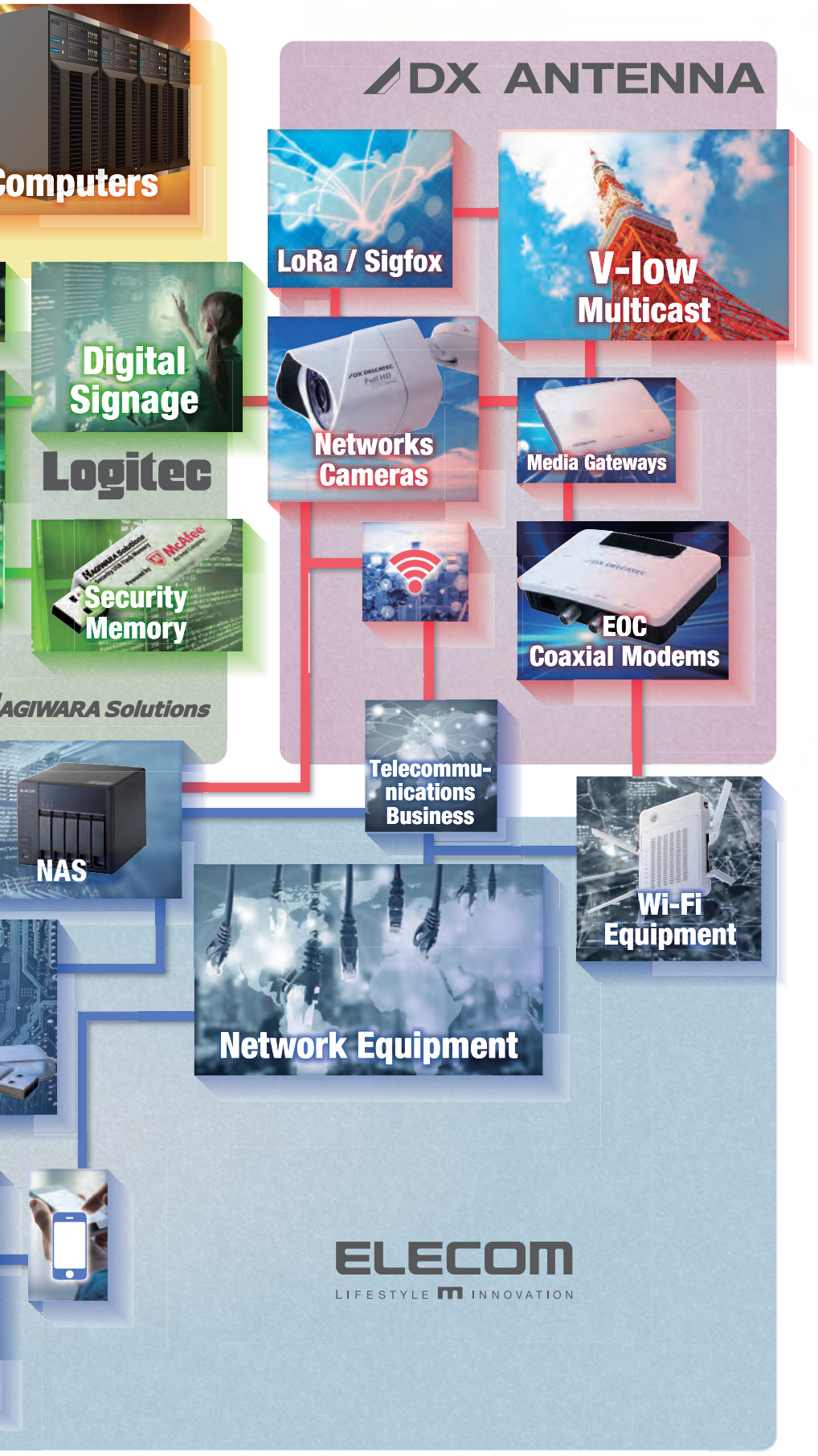
Field applications engineers (FAE = sales engineer) are stationed in Tokyo, Nagoya, and Osaka.
Working in coordination with development sites, they give rapid and detailed support to users via sales offices and dealerships.



Following our acquisition of Japan Data Systems, from 2018 our lineup now includes embedded computers, motherboards, and IoT gateways for industrial equipment. Combined with flash storage products for industrial equipment, our solutions are much commended by users for their high level of reassurance. The scope of the industrial solutions offered by Hagiwara Solutions continues to broaden.

Using group synergy to expand Elecom Group solutions ever further





ELECOM
LIFESTYLE INNOVATION

Elecom Co., Ltd.

Elecom is known as a major computer supplier, branching out in recent years to supply products for tablets and smartphones, digital home field with enhanced development of network products, applications, cloud services, and provision of installation services for wireless LAN access points. The Elecom Group's mission is to serve as a bridge connecting innovations to lifestyles, pursuing user happiness and comfort while constantly seeking to create new markets.

Logitec

Logitec INA Solutions Co., Ltd.

With the aim of building direct and lasting relationships with our end-user customers, we began trading in 2011 after splitting off from Logitec. Our policy is to be able to provide what you need whenever you need it. Our aim is to be a company that can find the solutions for all our customers' problems. We will provide products and services that will impress, building on the technological capabilities, specializations, and impetus built up by Logitec over the years.

DX ANTENNA

DX Antenna Co., Ltd.

Advanced transmission technology built up over more than sixty years. We developing new services combining broadcasting and communications as the core of next-generation transmission systems, and exploring new fields for the future, such as disaster preparedness, social welfare, security, and wireless communications.

D-CLUE Technologies

D-Clue Technologies Co., Ltd.

We became a group company at the end of June 2017. We have superlative engineers in analog, digital, and firmware technology, with the ability to create from scratch entirely new innovations, to provide solutions with greater added value.

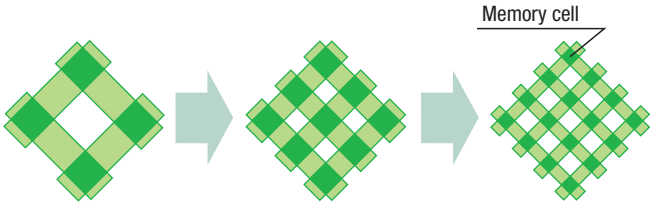
HAGIWARA Solutions

Next-generation Flash Memory 3D NAND

3D NAND

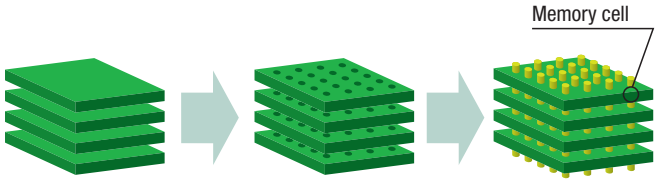
Flash memory with new technology to stack the layers of cells.
This achieves a leap to much greater capacities than standard 2D memory, improving speed and overall performance.

2D NAND



Capacity is increased by expanding cells with miniaturized surface areas.
*The limits of miniaturization. If the distance between cells becomes too narrow, they start to interfere with each other and make errors more likely to occur.

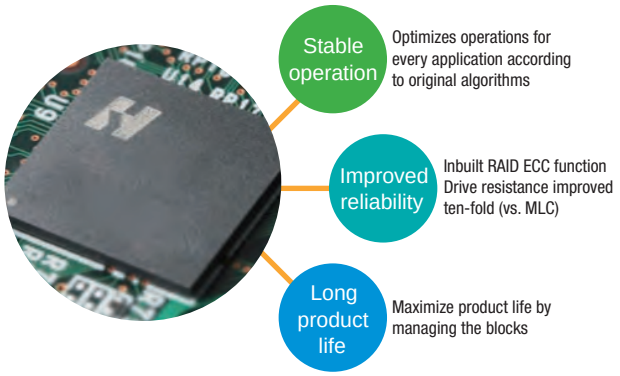
3D NAND



Stacks vertically to allow a wide distance between cells, for high-speed data processing and a further-expanded capacity.

Product features

Uses a 3D NAND-compatible original controller



3D-NAND lineup

In Development

SATA interface


2.5 inch


CFast


M.2 (2242)


M.2 (2280)

PCIe interface


U.2


CFexpress


M.2 (2242)


M.2 (2280)

SATA Interface Product Lineup


2.5 inch

Shape	Onboard DRAM	Series	Capacity	Operating temperature
2.5 inch	3D TLC (TLC mode)	K Series	30 GB to 1920 GB	0 to 70°C
		H Series	60 GB to 960 GB	
	3D pMLC (MLC mode)	H Series	80 GB to 320 GB	
	3D pSLC (SLC mode)	H Series	80 GB to 160 GB	


CFast

Shape	Onboard DRAM	Series	Capacity	Operating temperature
CFast	3D TLC (TLC mode)	K Series	60 GB to 240 GB	0 to 70°C
		H Series	60 GB to 240 GB	
	3D pMLC (MLC mode)	H Series	40 GB to 160 GB	
	3D pSLC (SLC mode)	H Series	20 GB to 80 GB	


M.2(2280)


M.2(2242)

Shape	Onboard DRAM	Series	Capacity	Operating temperature
M.2 2280	3D TLC (TLC mode)	K Series	30 GB to 1920 GB	0 to 70°C
M.2 2242	3D TLC (TLC mode)	H Series	60 GB to 240 GB	
	3D pMLC (MLC mode)	H Series	60 GB to 160 GB	
	3D pSLC (SLC mode)	H Series	40 GB to 80 GB	

eSD (Embedded SD)

New Product

Achieves reliability for SD cards for industrial equipment with onboard storage

Front-mounting SD card with I/F (JEDEC 100-Ball BGA). Utilizes SLC-type memory components to achieve an overwriting life ten times that of the eMMC. A new addition to our lineup that combines reliability with a smaller footprint for the host equipment.

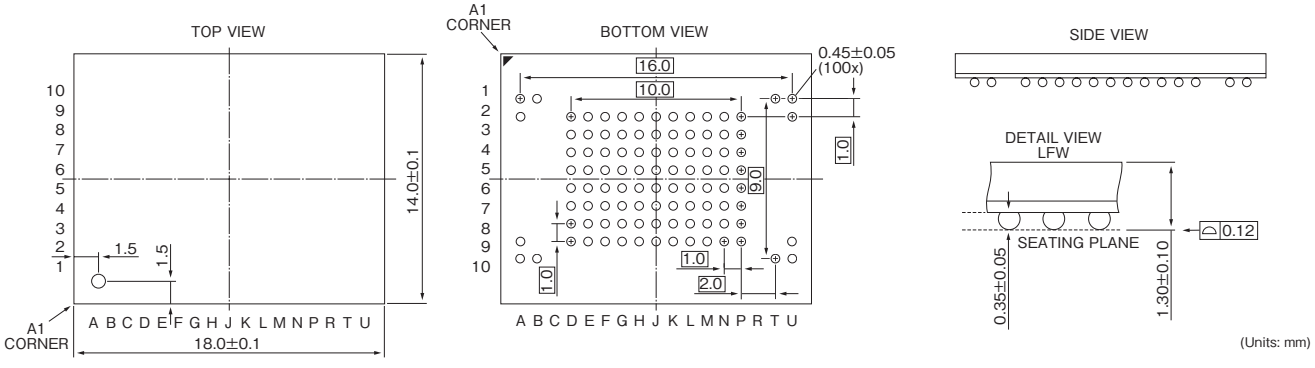
Package	100 Ball BGA (JEDEC standard) for industrial equipment (Ball pitch 1mm)
Interface	SDA standard compliant (Physical Layer Specification Ver. 3.00)
NAND used / product capacity	SLC (1 GB / 2 GB / 4 GB / 16 GB)
Guaranteed number of overwrites	1 GB, 2 GB: 50,000 times per block. 4 GB, 8 GB, 16 GB: 100,000 times per block.
Bus speed mode	1 GB to 16 GB
	Default speed mode (DS): 3.3 V signaling, maximum frequency 25 MHz, maximum 12.5 MB/s
	High speed mode (HS): 3.3 V signaling, maximum frequency 50 MHz, maximum 25 MB/s
	4 GB to 16 GB
	SDR12: 1.8 V signaling, maximum frequency 25 MHz, maximum 12.5 MB/s
	SDR25: 1.8 V signaling, maximum frequency 50 MHz, maximum 25 MB/s
	SDR50: 1.8 V signaling, maximum frequency 100 MHz, maximum 50 MB/s
	SDR104: 1.8 V signaling, maximum frequency 208 MHz, maximum 104 MB/s
	DDR50: 1.8 V signaling, maximum frequency 50 MHz, maximum 50 MB/s
Operating voltage	2.7 V to 3.6 V
Operating temperature	-40°C to 85°C
Other	• Drive life management function based on internal information • Read disturb error function • Wear leveling function • Power interruption measure function • Can provide socket boards for debugging

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
SLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Configuration and interface



Utilizes SD card interface

eSDs are standardized under SDA and use SD interfaces equipped in many microcomputers. This means they can easily be embedded in the host device without requiring an special controllers.

Enables stable long-term operation SLC onboard

Equipped with SLC type NAND flash memory that is longer lasting and more reliable compared to the MLC and TLC types primarily used for eMMC.

Uses 1 mm ball pitch

The package used is 100-Ball BGA with 1.0 mm pitch. Because this pitch allows the cables to pass between PADs, there is no need for special PAD on VIA processing

Point Onboard original NAND controller

The reliability of NAND flash memory is greatly affected by the NAND components used and the memory management functions controlling the NAND.
eSDs with original onboard NAND controllers with a track record of use as SDs for industrial equipment can achieve the optimum memory management for industrial equipment without the host being aware of it.

NEW

Original Active Refresh function to heighten reliability

Stores output main data e.g. boot loaders and kernels, with an expanded refresh function to deal with read disturb errors caused by repeated reading. Equipped with an original active refresh function incorporating a function to avoid read errors by managing the number NAND reads.

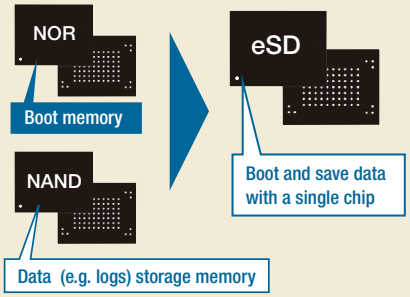
Point Able to monitor internal status

Can provide various types of tools enabling preventive maintenance and predictive maintenance. Can acquire the necessary information to check the status of the device e.g. number of overwrites and remaining spare block percentage.

- Product life assessment software (for Windows)
- API (for Windows / Linux)
- Displays the required commands for product life prediction

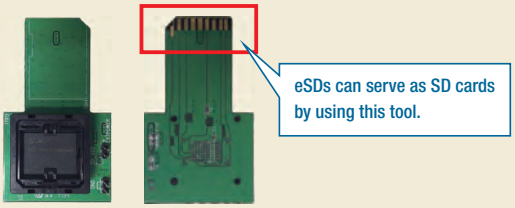
Point Optimum for replacing from the boot memory NOR

Reduces mounting area and costs by also serving as memory for data storage with replacing from NOR.
It has major advantages in reliability (e.g. data retention) even compared to the eMMC, which has MLC/TLC NAND flash memory onboard.



SD conversion tool for eSD evaluation

We have SD conversion tools for evaluation available.
(As a pay service)



Product number HPC-SDN1AE

Practical example

Using NOR	Using NOR+NAND	Using eMMC	Examining SD for embedding	
Issues	**Issues**	**Issues**	**Issues**	**Issues**
Insufficient capacity due to increase in stored data	For those wishing to combine devices to reduce costs	Want to use it for long periods, but worry about MLC/TLC reliability	Removable media might result in bad contact due to vibration	Inserting the SD card during production requires man-hours
Solutions	**Solutions**	**Solutions**	**Solutions**	**Solutions**
Capacity: 1 GB to 16 GB (NOR: Up to 128 MB)	eSDs are high reliable and have large capacities Mounting type reduces man-hours	eSDs use highly reliable SLC	Mounting type with strong vibration resistance	Mounting type reduces man-hours

Product Features of the SD Memory Card S Series

Product features of the S Series

Feature 1 Enhanced Random Access characteristics

Uses a more advantageous memory management method for Random Write compared to previous products.
Achieves faster Random Write Speed speeds.

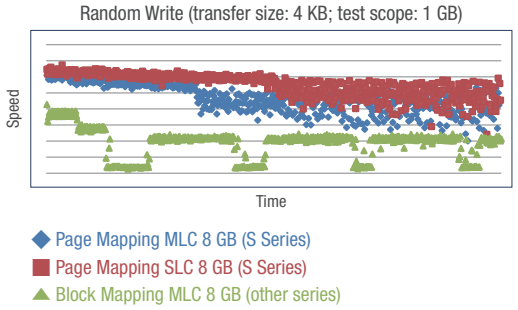
Measuring conditions	Random 512KByte		Random 4KByte	
	Read	Write	Read	Write
Previous products	79.20	4.195	6.026	0.304
S Series	85.25	22.87	6.817	1.034

Measuring environment
CrystalDiskMark 3.0.3
Transfer size: 500 MiB

Optimizing access speeds during Random Access

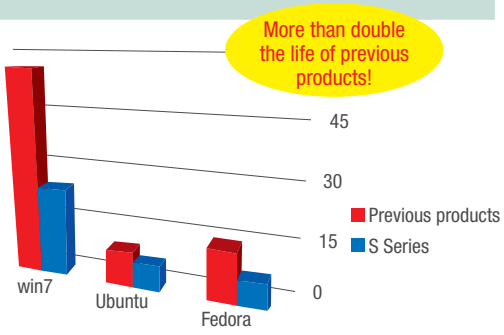
Feature 2 Stabilized performance

Even in cases where speeds of previous SD cards markedly diminish with continuous use, depending on how they are used, the S Series has a memory management system specialized for Random Access, able to maintain a level of performance even with continuous use.



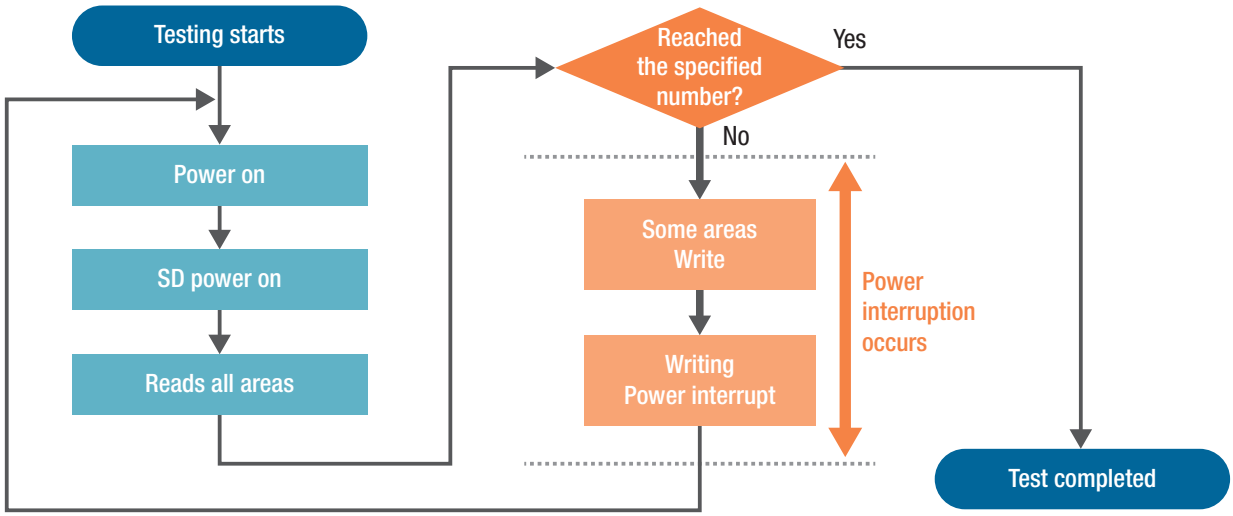
Feature 3 Enhanced product life with improved rewrite efficiency

Even if the writing volume is the same, the volume of data written to NAND flash varies greatly due to the different controller management methods.
The S Series has a long product life due to improved writing efficiency.



Feature 4 Strong power interruption resistance

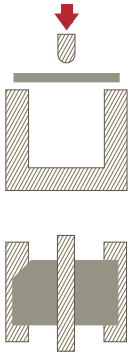
Tests for power interruptions during data writing are carried out to confirm no read errors occur in 10,000 tests.



Feature 5 Mechanical Robustness

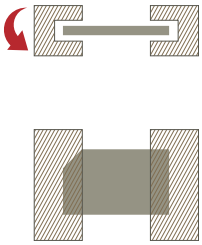
Our SD card for industrial equipment undergoes strength testing to a higher level than ordinary SD standards. It has resistant to physical stresses such as bending or twisting. Its physical strength is confirmed at approximately double the level compared to SD cards of other companies.

Bending tests (The standard SD specification is 10N)



Power	Our H Series	Generic SD
10N	Pass	Pass
20N	Pass	Pass
30N	Pass	Pass
40N	Pass	Opens on the case port side
50N	Slightly curved	Opens on the case port side
60N	Very curved	Opens on the case port side Very curved

Torsion tests (The standard SD specification is 0.15N)



Power	Our H Series	Generic SD
0.25N	Pass	Pass
0.30N	Pass	Pass
0.35N	Pass	Pass
0.40N	Pass	Opens on the case port side
0.45N	Slightly curved	Opens on the case port side Slightly curved
0.50N	Slightly curved	Opens on the case port side Slightly curved

Feature 6 Compatible with product life diagnostic software

Product life diagnostic software dedicated to the the SD Memory Card / S Series.
Users can check the status of the SD memory card in their own environment.

SD LiveMonitor function

1. Reads S.M.A.R.T. information
2. Saves S.M.A.R.T. information as text
3. Displays the remaining product life
4. Displays the average number of rewrites
5. Displays the maximum number of rewrites
6. Displays the total number of rewrites
7. Displays the product life of spare blocks

Meter color	Remaining product life
Green	If 20% or over
Yellow	If over 10% but less than 20%
Red	If under 10%

*Windows only

Dedicated card reader for life diagnostics
Product number HPC-SDR1AD

Product comparison

SD memory card able to determine product life, developed for embedding in industrial equipment.

Our lineup consists of products from various series to meet user needs.

Series name	Reliability	Fixed parts	Rewrite efficiency	Random Write characteristics	Physical strength	Cost	Diagnostic tool	Analysis compatible
S Series	◎	◎	◎	◎	◎	△	○	◎
K Series	○	△	△	△	◎	◎	○	△

SD Memory Card

High-speed Random Access S Series
Fixed Specification K Series

		S Series			K Series	
Flash memory		MLC	Q-MLC	SLC	MLC	SLC
Capacity		8 GB to 256 GB	4 GB to 128 GB	512 MB to 32 GB	2 GB to 128 GB	128 MB, 512 MB to 16 GB
Interfaces		SD 3.0 *1				
Operating voltage		27 V to 36 V				
Operating temperature	Wide temperature	-25°C to 85°C		-	-25°C to 85°C	
	Wide temperature	-		-40°C to 85°C	-	-40°C to 85°C
Storage temperature		-40°C to 85°C			-40°C to 85°C	
Operating humidity		To 95% (no condensation)				
Storage humidity		To 95% (no condensation)				
Dimensions (mm)		24 x 32 x 21				
Maximum transfer rate	Sequential reading (MB/s)	[UHS-1] 78	[UHS-1] 88	[UHS-1] 90	[UHS-1] 90	[UHS-1] 88
	Sequential writing (MB/s)	[UHS-1] 70	[UHS-1] 80	[UHS-1] 70	[UHS-1] 63	[UHS-1] 79
	Random reading (IOPS)	-	-	-	-	-
	Random writing (IOPS)	-	-	-	-	-
Power consumption	Read (max.)	210	170	150	120	110
	Write (max.)	170	140	150	180	130
Warranty period		1 year				

*1 12 GB or smaller are SD 2.0.

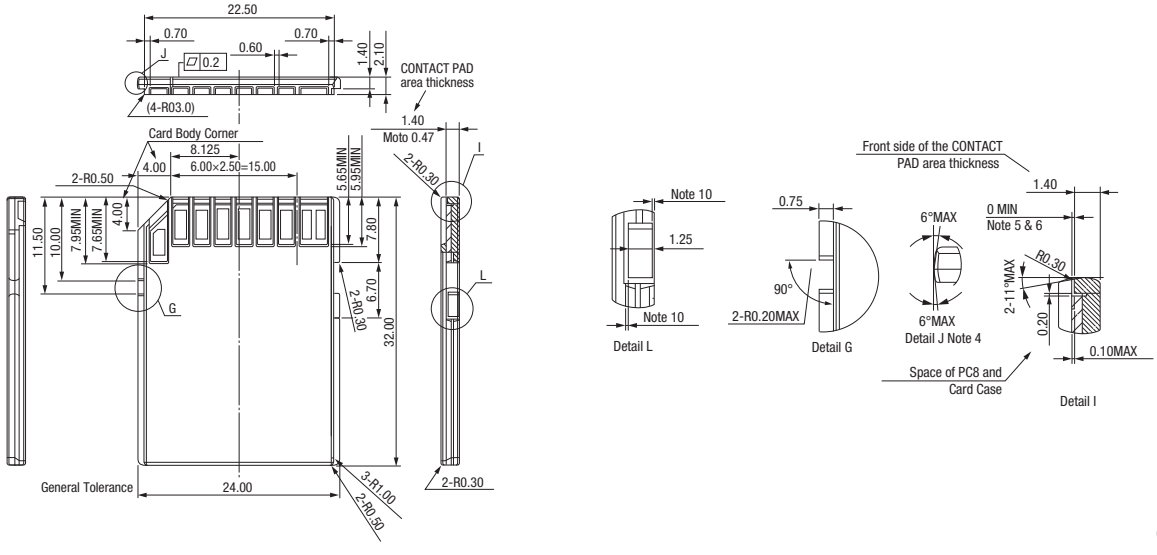
S Series	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
Q-MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
SLC	●	●	-	-	-	●	●	-	-	●	-	-	●	●	●	●

K Series	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●*2	●	-	-	○	-	-	●	●	-	-
SLC	●	●	-	-	-	●*2	●	-	-	○	-	-	●	●	-	-

●: Onboard ○: Optional
*Refer to page 36

*2 Controller/NAND flash processes and firmware are fixed.

Exterior diagram



(Units: mm)

Product number

S Series	MLC	Q-MLC	SLC
Wide temperature -25°C to 85°C	NSDB-xxxGS (N**M*S	NSDB-xxxGS (N**Q*S	-
Wide temperature -40°C to 85°C	-	-	NSDB-xxxGS (N**SEI

K Series	MLC	SLC
Wide temperature -25°C to 85°C	NSDB-xxxGK (L**MHI	NSD*-xxxxK (L**SEI
Wide temperature -40°C to 85°C	-	NSD*-xxxxK (***SEI

microSD Memory Card

High-speed Random Access S Series
Fixed Specification K Series

		S Series			K Series	
Flash memory		MLC	Q-MLC	SLC	MLC	SLC
Capacity		8 GB to 64 GB	4 GB to 32 GB	1 GB to 4 GB	2 GB to 32 GB	128 MB, 512 MB to 2 GB
Interfaces		SD 3.0 *1				
Operating voltage		2.7V to 3.6V				
Operating temperature	Wide temperature	-25°C to 85°C		-	-25°C to 85°C	
	Wide temperature	-		-40°C to 85°C	-	
Storage temperature		-40°C to 85°C				
Operating humidity		To 95% (no condensation)				
Storage humidity		To 95% (no condensation)				
Dimensions (mm)		11 x 15 x 1				
Maximum transfer rate	Sequential reading (MB/s)	[UHS-1] 86	[UHS-1] 80	[UHS-1] 30	[UHS-1] 85	20
	Sequential writing (MB/s)	[UHS-1] 76	[UHS-1] 72	[UHS-1] 27	[UHS-1] 43	18
	Random reading (IOPS)	-	-	-	-	-
	Random writing (IOPS)	-	-	-	-	-
Power consumption	Read (max.)	190	135	90	105	60
	Write (max.)	150	125	120	115	90
Warranty period		1 year				

*1 12 GB or smaller are SD 2.0.

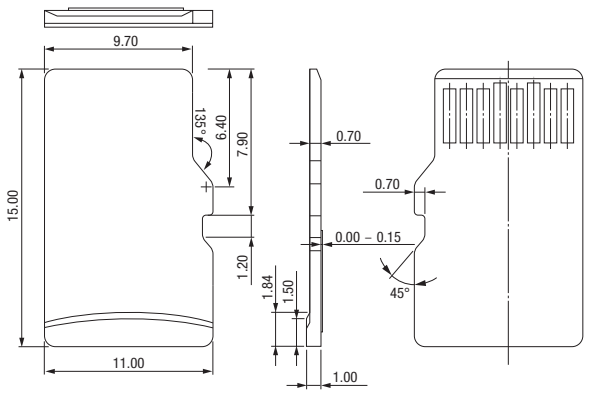
S Series	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
Q-MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
SLC	●	●	-	-	-	●	●	-	-	●	-	-	●	●	●	●

K Series	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●*2	●	-	-	-	-	-	●	●	-	-
SLC	●	-	-	-	-	●*2	●	-	-	-	-	-	●	●	-	-

●: Onboard ○: Optional
*Refer to page 36

*2 Controller/NAND flash processes and firmware are fixed.

Exterior diagram



(Units: mm)

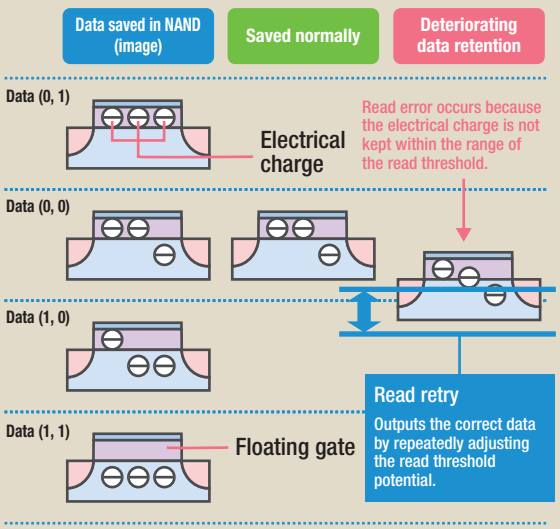
Product number

S Series	MLC	Q-MLC	SLC
Wide temperature -25°C to 85°C	MSDB-xxxGS (N**M*S	MSDB-xxxGS (N**Q*S	-
Wide temperature -40°C to 85°C	-	-	MSDB-xxxGS (***SDI

K Series	MLC	SLC
Wide temperature -25°C to 85°C	MSDB-xxxGK (L**MHI	MSD*-xxxxK (L**SEI
Wide temperature -40°C to 85°C	-	-

Read retry function

Outputs data correctly even as the memory data retention capacity diminishes and read errors occur, by repeated output while changing the reading time threshold.



SATA 6.0 Gbps Product Features

Product lineup

CFast

2.5-inch SATA

mSATA

HalfSlim

M.2

Functions to ensure stable long-term operation

This product complies with the high-speed Serial ATA interface standard (SATA Gen 3). Designed for embedding in industrial equipment or IoT related machinery, with functions to ensure stable operation even after long periods of continuous use.

Functions to maximize product life

Equipped with functions to maximize efficiency when writing to flash memory, in order to cope with use over long periods of time.

- Address management by 4K page mapping
- Improved garbage collection efficiency by hot/cold separation
- Cyclic scanning (total area refresh: data retention measure)

Function to ensure constant performance

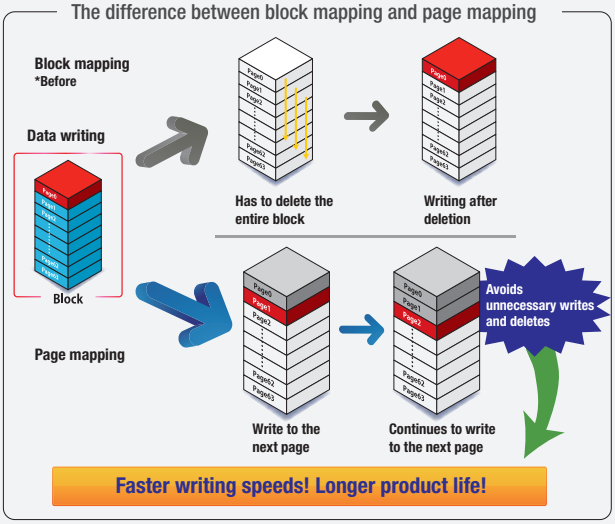
This onboard feature maintains a constant performance from the first time you use the product to the end of its life, for long-term continuous use.

- Fixes the capacity of the user data area and the management domain
- Manages the frequency of garbage collection (data movement)
- Uses EEC pipeline on-the-fly correction

Approach to maintaining consistent quality

All parts are subject to burn-in testing at shipment to ensure parts are fixed and prevent varying performance.

- Hardware designed for noise-resistant performance
- Parts are fixed to prevent performance variation, and initial defects are minimized with burn-in screening.
- Visualization of internal status via drive monitoring



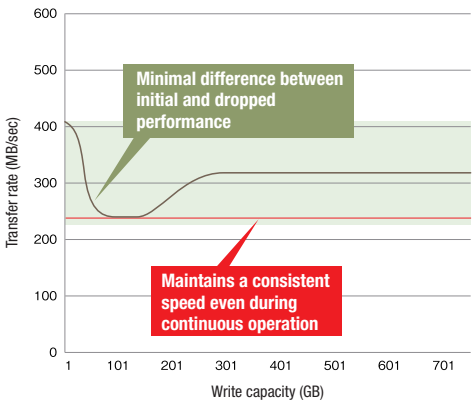
Stable speed performance

Comparison of SSD features

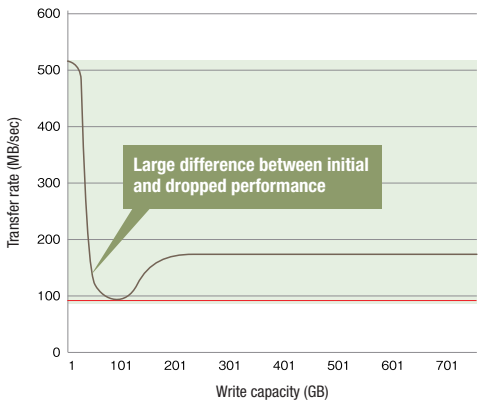
Hagiwara Solutions SSDs have a stable transfer rate that doesn't slow down even when writing continuously.

Test conditions: measuring changes in speed when writing approximately 700 GB sequentially.

Hagiwara Solutions SATA 6.0 Gbps SSD Q-MLC 30 GB

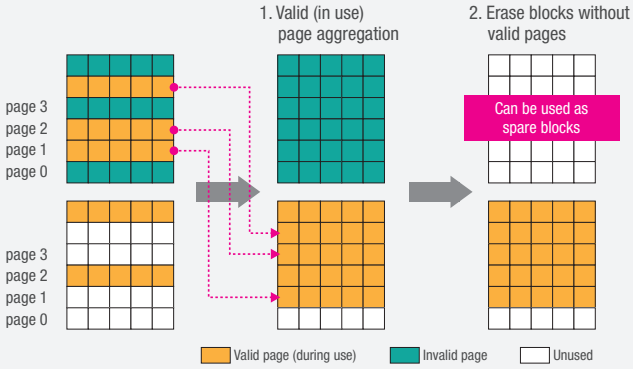


Another company's SATA 6.0 Gbps SSD 128 GB



Garbage collection generating empty blocks

The SATA 6.0 Gbps Series uses page mapping to improve speeds and maximize product life. This method defines 4 kilobytes as one unit (a page) and adds data to empty blocks, improving speeds through not having to erase blocks while writing data.
However, ongoing use results in scattered pages storing unused data, with few empty blocks. This results a block containing a mix of both valid and invalid pages. When this occurs, the valid and invalid data is reordered so that all pages inside the block are invalid pages, allowing it to be erased to free up empty blocks. This process is called “garbage collection.”
Garbage collection temporarily slows down the speed, but our SATA 6.0 Gbps Series intelligently sorts valid and invalid data to reduce unnecessary garbage collection and ensure stable writing operations.



Compatible with LiveMonitor SSD life diagnostics software

There is a limit to the number of times NAND flash memory in the SSD can be rewritten. Semiconductor storage has the advantages of high durability and performance, yet the ability to predict product life based on the rewrite limit is highly significant for storage for industrial equipment. LiveMonitor is a Windows app capable of SSD product life and failure prediction, based on SSD self-diagnostic S.M.A.R.T. information. The results of this product life prediction allow preventive maintenance by replacing the SSD with a new one before its life expires. Use of access analysis information also allows the SSD to be used effectively, maximizing its product life.

Basic Functions

Display of device information
- S.M.A.R.T. value
- Temperature
- Product life prediction

Access analysis <*1>
- Read/write ratio
- Transfer size ratio
- Sequential access ratio

Displays device block information <*1>
- Applications
- Duty cycle (current status and ongoing changes)
- Erasure frequency (current status and ongoing changes)
- Number of read operations
- Number of alternatives

Device settings <*2>
- Run SSD Secure Erase
- Run PSID Revert to reset TCG Opal settings to factory default
- Enable eDrive IEEE1667 settings for the SSD

Other <*2>
- SSD firmware update function
- PDF output for device and access information

<*1> Display of device block information and access ratio is limited to certain products in the SATA 6.0 Gbps Series. For more details on compatible products, refer to our website.
<*2> The SSD must have functions compatible with the settings.

Drive monitoring function

The drive’s internal conditions (e.g. memory fragmentation) can be visualized, supporting system configuration to optimize use of the SSD.

Access analysis

Visualizing the types of transfer sizes for reading/writing, frequency of sequential/random access and other information allows users to determine the optimum access method for their storage.

Access ratio

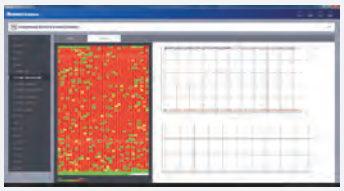
Acquires device information

Able to predict drive life by calculating relevant indicators such as WAF and TBW.

Device information

Acquires information from inside the SSD

Checks the usage of each block to determine the optimum product capacity and type, and to configure apps to maximize product life.



Block information, duty cycle

LiveMonitor Plus

In Development

The access analysis function of the life diagnostics monitoring software LiveMonitor enhances detailed visualization of data and improves operability. It can obtain RAS information from the motherboard used as well as the SSD.

Three factors for evaluation to verify whether the computer system can stably provide the expected functions and performance.

RAS information

R eliability (Reliability)
A vailability (Availability)
S erviceability (Serviceability)

LiveMonitor Plus acquires information for centralized control of life prediction data for the entire system.

- Acquisition of information for the entire system allows prediction of its overall product life.
- Information analysis can be fine-tuned e.g. to extract information for a set period.
- Cloud access allows information acquisition and aggregation to enable predictive maintenance.

CFast

SATA 6.0 Gbps

LFD10S-GD / XFD10S-GD / HFD10S-GD Series

Flash memory		MLC	Q-MLC	SLC
Capacity		30 GB to 240 GB	15 GB to 120 GB	7 GB to 60 GB
Interface		SATA 6.0 Gbps		
Operating voltage		3.3V±5%		
Operating temperature	Standard	0°C to 70°C		
	Wide temperature	-25°C to 85°C		-40°C to 85°C
Storage temperature		-45°C to 90°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 95% (no condensation)		
Dimensions (mm)		42.8 x 36.4 x 3.6		
DRAM cache		●	●	●
Maximum transfer rate	Sequential reading (MB/s)	430	460	480
	Sequential writing (MB/s)	320	410	350
	Random reading (IOPS)	44,000	47,000	45,000
	Random writing (IOPS)	62,000	61,000	50,000
TBW (TB) *1	7 GB	-	-	260
	15 GB	-	91	530
	30 GB	18	180	1000
	60 GB	36	360	2100
	120 GB	73	730	-
	240 GB	150	-	-
Power consumption (mA)	Read (max.)	350	350	450
	Write (max.)	680	450	580
	Idle mode	30	110	110
	DevSleep mode	3		
Warranty period		1 year		

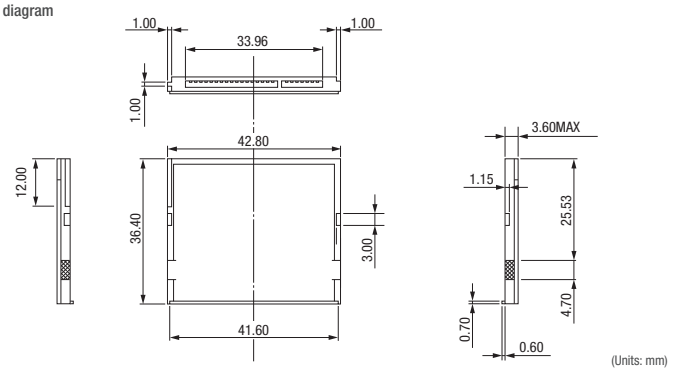
*1 Total Bytes Written (TBW) is calculated as write load conditions on the basis of JEDEC 219 Client.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	●	●	●	●	○	○	●	-	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	●	○	○	●	-	●	●	●	●	●
SLC	●	●	●	●	●	●	●	○	○	●	-	●	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram

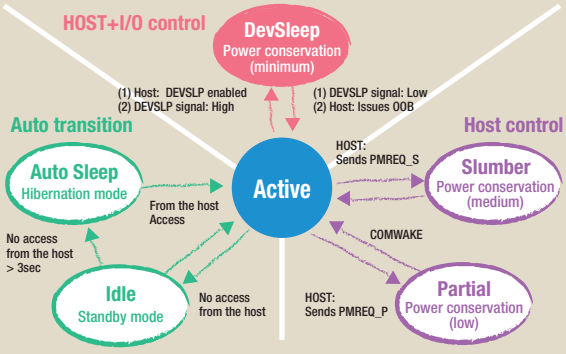


Product number

	MLC	Q-MLC	SLC
Standard 0°C to 70°C	LFD10S-xxxGD (A**AH)	XFD10S-xxxGD (A**AH)	HFD10S-xxxGD (A**AE)
Wide temperature -25°C to 85°C	LFD10S-xxxGD (A**AHS	XFD10S-xxxGD (A**AHS	-
Wide temperature -40°C to 85°C	-	-	HFD10S-xxxGD (A**AEI

DevSleep function

Shifting to DevSleep mode greatly reduces standby power consumption.



2.5-inch SATA SSD

SATA 6.0 Gbps

LFD25S-GD / XFD25S-GD / HFD25S-GD Series

Flash memory		MLC	Q-MLC	SLC
Capacity		30 GB to 960 GB	15 GB to 480 GB	7 GB to 240 GB
Interface		SATA 6.0 Gbps		
Operating voltage		5V±5%		
Operating temperature	Standard	0°C to 70°C		
	Wide temperature	-25°C to 85°C		-40°C to 85°C
Storage temperature		-45°C to 90°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 95% (no condensation)		
Dimensions (mm)		69.85 x 99.9 x 7.0		
DRAM cache		●	●	●
Maximum transfer rate	Sequential reading (MB/s)	440	480	500
	Sequential writing (MB/s)	450	450	380
	Random reading (IOPS)	52,000	53,000	54,000
	Random writing (IOPS)	56,000	53,000	61,000
TBW (TB) *1	7 GB	-	-	260
	15 GB	-	91	530
	30 GB	18	180	1000
	60 GB	36	360	2100
	120 GB	73	730	4200
	240 GB	150	1700	9700
	480 GB	310	3400	-
	960 GB	620	-	-
Power consumption (mA)	Read (max.)	410	290	440
	Write (max.)	770	320	520
	Idle mode	90	90	90
	DevSleep mode	10		
Warranty period		1 year		

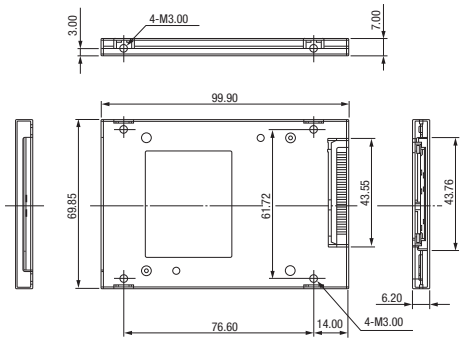
*1 Total Bytes Written (TBW) is calculated as write load conditions on the basis of JEDEC 219 Client.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●
SLC	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram



(Units: mm)

Product number

	MLC	Q-MLC	SLC
Standard 0°C to 70°C	LFD25S-xxxGD (A**AH)	XFD25S-xxxGD (A**AH)	HFD25S-xxxGD (A**AE)
Wide temperature -25°C to 85°C	LFD25S-xxxGD (A**AHS	XFD25S-xxxGD (A**AHS	-
Wide temperature -40°C to 85°C	-	-	HFD25S-xxxGD (A**AEI

TCG Opal 2.0 function

The high security functions of preboot authentication, security area segmentation, and centralized storage management via remote are realized in the combination of application software compatible with Opal specifications.

Can be performed for drives compatible with TCG Opal

Pre-boot authentication

OS launch authentication using pre-boot area

Access controls

- Keys can be made for multiple areas (ranges)
- Authentication results allow access controls e.g. read/write

Secure erase

- When the encryption key is erased, the data is instantly disabled (for the entire drive and all ranges)
- Remaining data (e.g. old trash data or substitute blocks) can be easily erased

eDrive compatible (hardware encryption)

eDrive is a security storage specification defined by BitLocker, usable with Microsoft. It is based on TCG OPAL and IEEE1667 specifications.

With Windows you can use BitLocker to utilize TCG Opal functions. Hagiwara Solutions also provides a duplicator able to copy drives compatible with BitLocker hardware encryption.

mSATA

SATA 6.0 Gbps

LFDMSS-GD / XFDMSS-GD / HFDMSS-GD Series

Flash memory		MLC	Q-MLC	SLC
Capacity		30 GB to 240 GB	15 GB to 120 GB	7 GB to 60 GB
Interface		SATA 6.0 Gbps		
Operating voltage		3.3V±5%		
Operating temperature	Standard	0°C to 70°C		
	Wide temperature	-25°C to 85°C		-40°C to 85°C
Storage temperature		-45°C to 90°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 95% (no condensation)		
Dimensions (mm)		29.85 x 50.8 x 4.0		
DRAM cache		●	●	●
Maximum transfer rate	Sequential reading (MB/s)	430	460	470
	Sequential writing (MB/s)	320	410	330
	Random reading (IOPS)	34,000	48,000	48,000
	Random writing (IOPS)	60,000	62,000	53,000
TBW (TB) *1	7 GB	-	-	260
	15 GB	-	91	530
	30 GB	18	180	1000
	60 GB	36	360	2100
	120 GB	73	730	-
	240 GB	150	-	-
Power consumption (mA)	Read (max.)	350	350	440
	Write (max.)	670	470	550
	Idle mode	110	110	110
	DevSleep mode	3		
Warranty period		1 year		

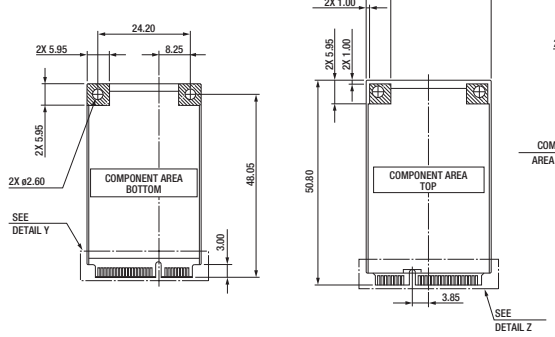
*1 Total Bytes Written (TBW) is calculated as write load conditions on the basis of JEDEC 219 Client.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q-MLC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
SLC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram



(Units: mm)

Product number

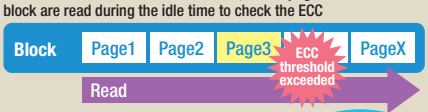
	MLC	Q-MLC	SLC
Standard 0°C to 70°C	LFDMSS-xxxGD (A**AH)	XFDMSS-xxxGD (A**AH)	HFDMSS-xxxGD (A**AE)
Wide temperature -25°C to 85°C	LFDMSS-xxxGD (A**AHS	XFDMSS-xxxGD (A**AHS	-
Wide temperature -40°C to 85°C	-	-	HFDMSS-xxxGD (A**AEI

Offline scan function

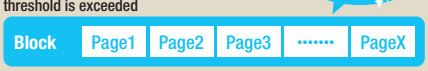
This function operates in the background to re-arrange the blocks with degraded data retention. It suppresses the frequency of corrupted data from long-term operation and prevents system shutdown.

Number of reads is counted in units of blocks

If the set number of reads is exceeded, all the pages of the said block are read during the idle time to check the ECC



Refreshes the entire block if the ECC threshold is exceeded



HalfSlim

SATA 6.0 Gbps

LFDHSS-GD / XFDHSS-GD / HFDHSS-GD Series

Flash memory		MLC
Capacity		30 GB to 240 GB
Interfaces		SATA 6.0 Gbps
Operating voltage		5.0V±10%
Operating temperature	Standard	0°C to 70°C
	Wide temperature	-25°C to 85°C
Storage temperature		-45°C to 90°C
Operating humidity		To 85% (no condensation)
Storage humidity		To 95% (no condensation)
Dimensions (mm)		39.00 x 54.00 x 5.98
DRAM cache		●
Maximum transfer rate	Sequential reading (MB/s)	440
	Sequential writing (MB/s)	115
	Random reading (IOPS)	31,000
	Random writing (IOPS)	28,000
TBW (TB) *1	7 GB	-
	15 GB	-
	30 GB	18
	60 GB	36
	120 GB	73
	240 GB	150
Power consumption	Read (max.)	240
	Write (max.)	255
	Idle mode	80
	DevSleep mode	-
Warranty period		1 year

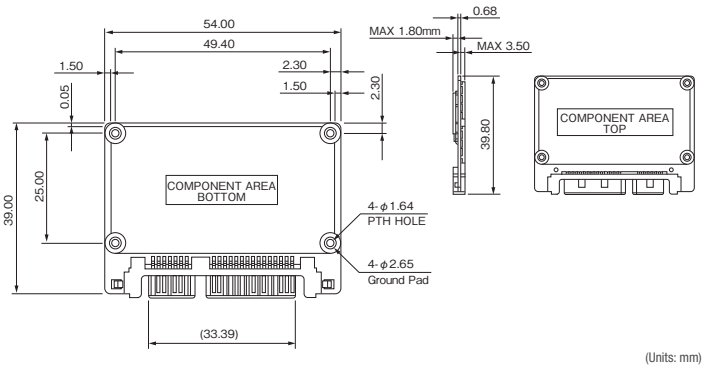
*1 Total Bytes Written (TBW) is calculated as write load conditions on the basis of JEDEC 219 Client. *Specifications during development as of November 2017.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram



(Units: mm)

Product number

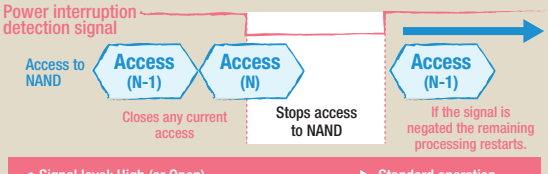
	MLC
Standard 0°C to 70°C	LFDHSS-xxxGD (A**AH)
Wide temperature -25°C to 85°C	LFDHSS-xxxGD (A**AHS

Power loss guard function

To cope with power outages, memory access during a sudden power outage will be prevented on receiving a power shut-down notification signal from the host. This function prevents device damage against power outages during data writing.

Power interruption detection signal

SATA 3G and 6G products are equipped with power interruption detection signals. Asserting (Active-L) signals from the host vs. the power interruption detection signals stops the device writing to NAND.



- Signal level: High (or Open) → Standard operation
- Signal level: Low → Stops access to NAND

* Refer to "Input Characteristics" in the data sheet for input characteristics of the power interruption detection signal.

M.2 (K series)

SATA 6.0 Gbps

2242 Size KFDM4S-GK Series
2280 Size KFDM8S-GJ Series

Flash memory		MLC 2242 Size	MLC 2280 Size
Capacity		30 GB to 480 GB	120 GB to 960 GB
Interfaces		SATA 6.0 Gbps	
Operating voltage		3.3V±5%	
Operating temperature	Standard	0°C to 70°C	
	Wide temperature	-	
Storage temperature		-45°C to 90°C	
Operating humidity		To 85% (no condensation)	
Storage humidity		To 95% (no condensation)	
Dimensions (mm)		22.0 x 42.0 x 3.85	22.0 x 80.0 x 3.85
DRAM cache		-	●
Maximum transfer rate	Sequential reading (MB/s)	430	460
	Sequential writing (MB/s)	410	430
	Random reading (IOPS)	77000	67000
	Random writing (IOPS)	76000	76000
TBW (TB) *1	30 GB	45	-
	60 GB	90	-
	120 GB	181	257
	240 GB	262	514
	480 GB	544	1028
	960 GB	-	2057
Power consumption	Read (max.)	280	800
	Write (max.)	275	1350
	Idle mode	105	80
	DevSleep mode	-	-
Warranty period		1 year	

*1 Total Bytes Written (TBW) is calculated as write load conditions on the basis of JEDEC 219 Client.

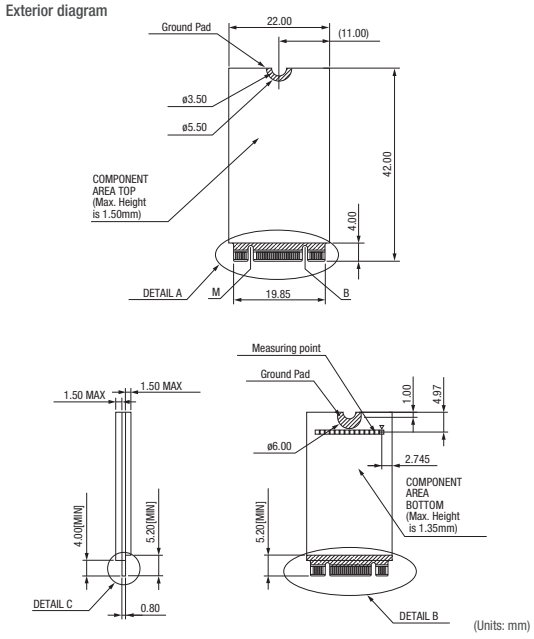
	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC 2242 Size	●	●	●	●	●	●	●	-	-	●	-	-	●	-	●	●
MLC 2280 Size	●	●	●	●	●	●	●	-	-	●	-	-	●	-	●	●

●: Onboard ○: Optional

*Refer to page 36

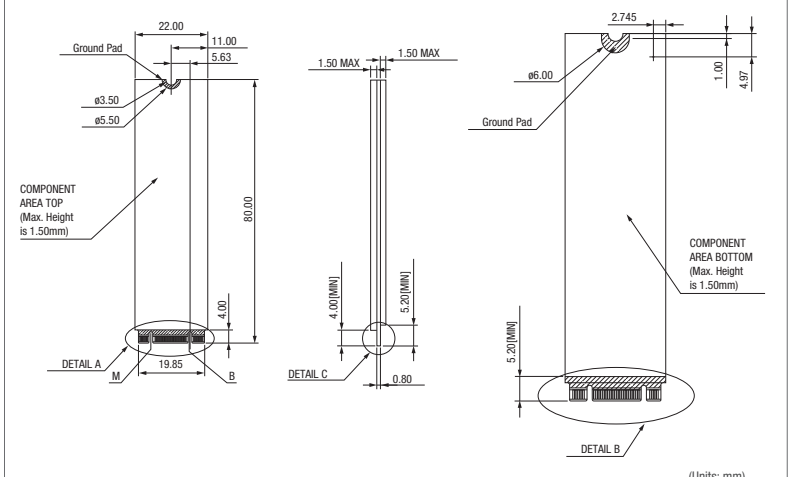
2242 Size

Exterior diagram



2280 Size

Exterior diagram



Product number

	MLC 2242 Size	MLC 2280 Size
Standard 0°C to 70°C	KFDM4S-xxxGK (A**MH)	KFDM8S-xxxGJ (A**MH)

SSD Life Diagnostics Software LiveMonitor

for SSD

There is a limit to the number of times NAND flash memory in the SSD can be rewritten. Semiconductor storage has the advantages of high durability and performance, yet the ability to predict product life based on the rewrite limit is highly significant for storage for industrial equipment. LiveMonitor is a Windows app capable of SSD product life and failure prediction, based on SSD self-diagnostic S.M.A.R.T. information. The results of this product life prediction allow preventive maintenance by replacing the SSD with a new one before its life expires. Use of access analysis information also allows the SSD to be used effectively, maximizing its product life.

Basic Functions

Display of device information
- S.M.A.R.T. value
- Temperature
- Product life prediction

Access analysis <*1>
- Read/write ratio
- Transfer size ratio
- Sequential access ratio

Display of device block information <*1>
- Applications
- Duty cycle (current status and ongoing changes)
- Erasure frequency (current status and ongoing changes)
- Number of read operations
- Number of alternatives

Device settings <*2>
- Run SSD Secure Erase
- Run PSID Revert to reset TCG Opal settings to factory default
- Enable eDrive IEEE1667 settings for the SSD

Other <*2>
- SSD firmware update function
- PDF output for device and access information

1. Display of device block information and access ratio is limited to certain products in the SATA 6.0 Gbps Series. For more details on compatible products, refer to our website.
2. The SSD must have functions compatible with the settings.

Drive monitoring function

The drive's internal conditions (e.g. memory fragmentation) can be visualized, supporting system configuration to optimize use of the SSD.

Access analysis

Visualizing the types of transfer sizes for reading/writing, frequency of sequential/random access and other information allows users to determine the optimum access method for their storage.

Access ratio

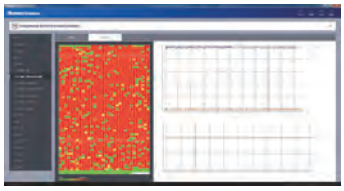
Acquires device information

Able to predict drive life by calculating relevant indicators such as WAF and TBW.

Device information

Acquires information from inside the SSD

Checks the usage of each block to determine the optimum product capacity and type, and to configure apps to maximize product life.



Block information, duty cycle

LiveMonitor Plus

In Development

The access analysis function of the life diagnostics monitoring software LiveMonitor enhances detailed visualization of data and improves operability. It can obtain RAS information from the motherboard used as well as the SSD.

Three factors for evaluation to verify whether the computer system can stably provide the expected functions and performance.

RAS Information

Reliability (Reliability)
Availability (Availability)
Serviceability (Serviceability)

LiveMonitor Plus acquires information for centralized control of life prediction data for the entire system.

- Acquisition of information for the entire system allows prediction of its overall product life.
- Information analysis can be fine-tuned e.g. to extract information for a set period.
- Cloud access allows information acquisition and aggregation to enable predictive maintenance.

High-speed copying of SSD compatible with Microsoft's BitLocker hardware encryption

SATA Drive Duplicator Compatible with BitLocker

Data copying by standard duplicators can only use BitLocker encryption software, as eDrive is not recognized by the operating system.
The load* required when enabling BitLocker can be minimized if eDrive is recognized and embedded in the equipment.

* E.g. data encryption by software requiring time for processing.

(The photo shows a product in development)

Compatible with eDrive duplication

- Duplication is possible of drives meeting the requirements of eDrive, compatible with BitLocker hardware encryption processing.
- eDrive does not require the time-consuming encryption or decryption when BitLocker is active or disabled.

Data copying and comparison function

- Simultaneously copies to 4 drives
- Supports two copy modes
  (1) All areas (entire drive) (2) To the final partition
- Supports a function to compare copied and source data

Onboard data erasure function

- Complete data erasure by Security Erase Unit command

Onboard screening function

- Read / verify test

Product name / model number	SATA drive duplicator (Product number: DPCB-100A)
Number of connected units	Copy source: 1 device. Copy destination: 1 to 4 devices
Copying speed	18 GB per minute (theoretical value)
Expansion interface	USB 3.0 * Used when connecting to a computer while using the dedicated software
Copy	(1) All areas of the drive (2) To the final partition
Comparison	Comparison of copied and source data
Data erasure	Complete data erasure by Security Erase Unit command
Screening	Read / verify test

Clipping	Compatible (when operated with dedicated computer software)
Compatible SATA drives	2.5-inch / 3.5-inch SSD / HDD * For SSDs other than those above (e.g. CFast or M.2), please prepare a separate conversion adapter. * eDrive duplication has been operationally verified with our SSDs.
Compatible format	FAT16, FAT32, NTFS
Size/weight	W 300 mm x H 285 mm x D 225 mm / 6.7 Kg
Operation Environment	Temperature: 5°C to 40°C. Humidity: 20% to 80%
Attachments	Power supply cable

Forms RAID by connecting two SATA 6.0 Gbps drives

SATA 6.0 Gbps Interface RAID Board

In Development

A high-functionality RAID board connecting to SATA Gen 3 (6.0 Gbps) installable in a 3.5-inch drive to construct RAID with 2 SSDs/HDDs

(Image of product in development)

SATA Gen 3 compatible

- Host interface: SATA Gen 3 (6.0 Gbps)
- Drive interface: SATA Gen 3 (6.0 Gbps)

No need for drivers

- Connects to higher SATA without depending on the BIOS or operating system of the system it connects to, enabling multi-function RAID.

Compatible with two RAID modes

- RAID 0: striping mode
- RAID 1: mirroring mode

* Also compatible with spanning (JBOD).

Function to enhance reliability

- Online rebuild compatible (in RAID 1 operation)
- Hot swap compatible (in RAID 1 operation)
- Equipped with sector read patrol function (detects secondary errors with read and verify)
- The power supply circuit is equipped with EMI safeguard parts

If an error occurs in the connecting drive

- Overwrites the error point to correct it
- If the drive does not respond, replace using degraded hot swap

* When operating in RAID 1

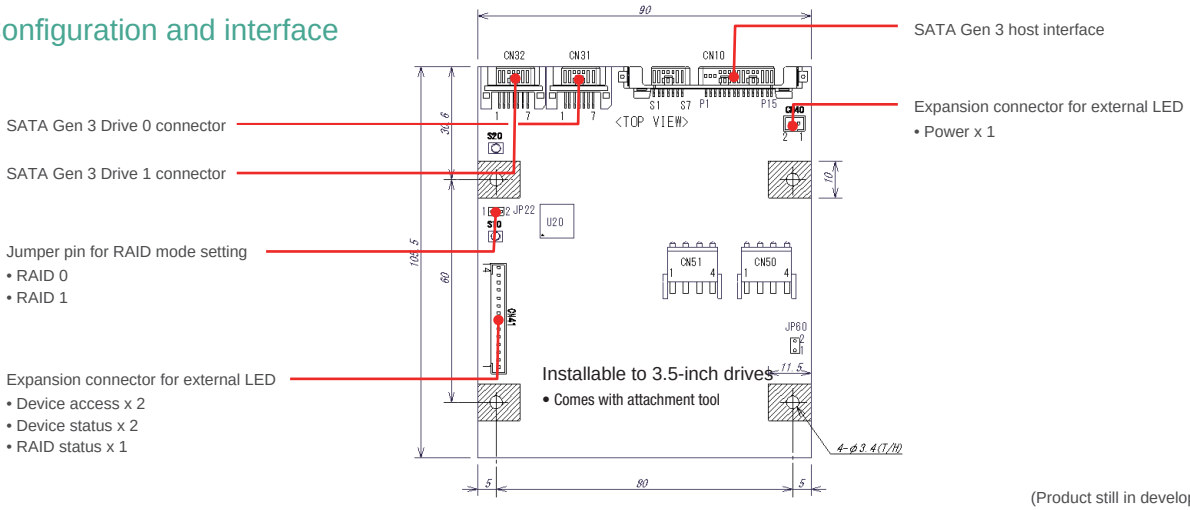
Function supporting operation management

- Save in drive connecting to RAID information
- S.M.A.R.T. checks at regular intervals (times can be adjusted)
- Connects with the dedicated RAID Manager software
  Can check the status of the drive
- Compatible with firmware updates via the host SATA interface

Product specifications

Product number	SR-DS2LE
Host interface	SATA Gen 3 (6.0 Gbps)
Drive interface	SATA Gen 3 (6.0 Gbps) x 2ch
RAID mode	• RAID 0 (striping) • RAID 1 (mirroring) ※Set by Jumper plug
Compatible SATA drives / number connecting	2.5-inch / 3.5-inch SSD, HDD / 2
Size/weight	W 90 mm x H 20 mm x D 105.5 mm (board size) / 45 g (device board only)
Power/consumption current	DC 12V / Max 5A, DC 5V / Max 5A (with drive power supply) *Single board is DC 5V / Max 400mA
Operating environment	Temperatur: 5°C to 40°C. Humidity: 20% to 80%

Configuration and interface



(Product still in development and subject to change)

Forms RAID 1 with 2.5-inch size

2.5-inch Mirror SSD Drive

Houses 2 mSATA Drive SATA 6.0 Gbps SSDs in a 2.5-inch form factor to construct RAID 1 (mirroring). Can construct RAID 1 (mirroring) even in small devices with just 1 drive, greatly enhancing system and data redundancy. If one mSATA SSD fails, the other mSATA SSD by itself can maintain continuous operation, greatly enhancing system operating reliability. Just swapping out the failed mSATA SSD results in an automatic rebuild of the RAID system, allowing the system to easily restore itself to RAID 1.

Constructs RAID 1 in a 2.5-inch form factor

Houses 2 mSATA Drive SATA 6.0 Gbps SSDs in a 2.5-inch form factor. Can construct RAID 1 (mirroring) even in small devices with just 1 drive.

Easy swapping (no need for drivers)

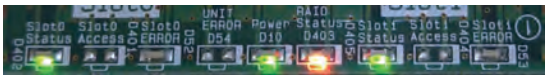
Because it connects to higher SATA, it doesn't depend on the BIOS or operating system of the system it connects to. It doesn't require a special driver and easily constructs a RAID environment simply by swapping it. Ships with mSATA embedded, so assessment of your devices is not required.

Stable operation due to mirroring function (RAID 1)

Even if one SSD fails, the other SSD by itself can easily run continuously with high reliability. When you replace the failed SSD, the data is automatically recovered (rebuilt) to reconstruct RAID 1.

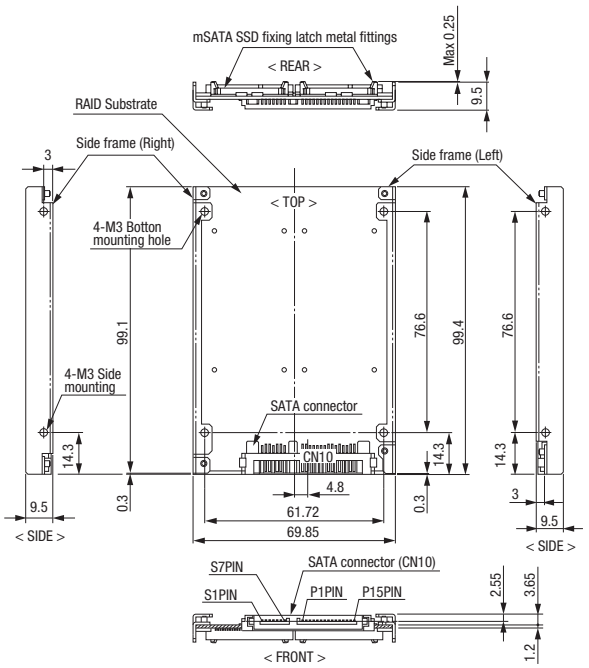
Onboard LED

Product is equipped with LEDs to visually indicate the SSD and RAID status.



Product specifications	
RAID mode	RAID 1 (mirroring) *Fixed mode
Host interface	SATA III (SATA Gne3: 6 Gbps) compliant
Device interface	SATA III (SATA Gne3: 6 Gbps) compliant mSATA SSd x 2ch
SATA command standard	ATA/ATAPI-7 compliant
Number of connecting SATA devices	Maximum of 2 (mSATA SSD)
Hot fix	Compatible
Read patrol function	Compatible (the time interval can be changed from the control tool)
Hot swap	Compatible (RAID operation or drive errors after hot swapping during access are not covered by warranty)
Online rebuild	Compatible
RAID control	Compatible with the dedicated control tool RAID Manager
mSATA SSD power control	Compatible (controls each mSATA SSD)
Onboard LED	Power, Slot Status x 2, Slot Error x 2, RAID Status
Size/weight	W 69.85 mm x H 100 mm x D 9.5 mm / 54 g
Power/consumption current	Overall: DC5V±5% / depends on the connecting mSATA SSD.
	RAID controller: DC5V±5%/400mA
Operating environment	Temperature: 0°C to 70°C. Humidity: 8% to 85%
Frame	2.5-inch drive bay mounting frame

Exterior diagram



(Units: mm)

	MLC	Q-MLC	SLC
Memory capacity	30 GB / 60 GB / 120 GB / 240 GB	15 GB / 30 GB / 60 GB / 120 GB	7 GB / 15 GB / 30 GB / 60 GB
Product number	RFD2LS-xxxGD(A10AH)	RFD2XS-xxxGD(A10AH)	RFD2HS-xxxGD(A10AH)
Replacement SSD model numbers	RFDMLS-xxxGD(A10AE)	RFDMXS-xxxGD(A10AH)	RFDMHS-xxxGD(A10AH)

CompactFlash Card

Fixed Disk Type
XFD10P-GR / HFD10P-GR Series

Removable Disk Type
LCF10P-GR / XCF10P-GR / HCF10P-GR Series

Flash memory		MLC	Q-MLC	SLC
Capacity		16 GB to 128 GB	16 GB to 64 GB	512 MB to 64 GB *1
Interfaces		Parallel ATA [Ultra ATA/66] CFA6.0		
Operating mode		Removable	Fixed disk / removable	
Transfer mode		PIO mode0-4 / Multiword DMA mode 0-2 / Ultra DMA mode 0-4		
Operating voltage		3.3V±5% / 5.0V±10%		
Operating temperature	Standard	0°C to 70°C		
	Wide temperature	-		-40°C to 85°C
Storage temperature		-45°C to 90°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 95% (no condensation)		
Dimensions (mm)		42.8 x 36.4 x 3.3		
DRAM cache		-	-	-
Maximum transfer rate	Sequential reading (MB/s)	55	50	55
	Sequential writing (MB/s)	45	45	50
	Random reading (IOPS)	-	-	-
	Random writing (IOPS)	-	-	-
Power consumption	Read (max.) (at 5V)	125	105	150
	Write (max.) (at 5V)	150	120	165
	Idle mode (at 5V)	10	10	10
	Read (max.) (at 33V)	160	135	185
	Write (max.) (at 33V)	200	155	205
	Idle mode (at 33V)	5	5	5
Warranty period		1 year		

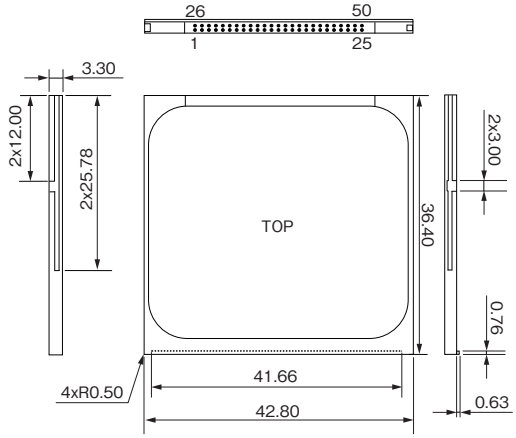
*1 The lineup for 512 MB to 8 GB is wide temperature only.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	-	●	●
Q-MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	-	●	●
SLC	●	●	●	-	-	●	●	-	-	●	-	-	●	-	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram



CompactFlash Storage Card Dimensions

(Units: mm)

Product number

	MLC	Q-MLC	SLC
Standard 0°C to 70°C	[Rem.] LCF10P-xxxGR (A**AH)	[Fixed] XFD10P-xxxGR (A**AH) [Rem.] XCF10P-xxxGR (A**AH)	[Fixed] HFD10P-xxxGR (A**AE) [Rem.] HCF10P-xxxGR (A**AE)
Wide temperature -40°C to 85°C	-	-	[Fixed] HFD10P-xxxGR (A**AEI) [Rem.] HCF10P-xxxGR (A**AEI)

Fixed specifications

Parts and firmware are fixed to ensure stable operation.

1st release	2nd release	3rd release
Normal	Evaluation / Verification	Evaluation / Verification	Evaluation / Verification
Fixed specifications	Evaluation / Verification	Parts and firmware are fixed so re-evaluation/ re-verification is not required	

2.5-inch PATA SSD

LFD25P-GD / XFD25P-GD / HFD25P-GD Series

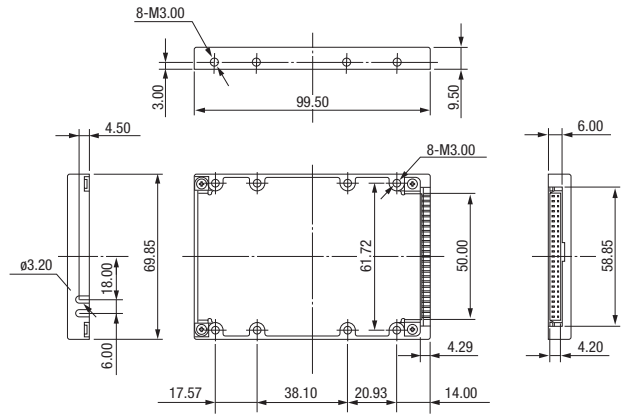
Flash memory		MLC	Q-MLC	SLC
Capacity		30 GB to 240 GB	15 GB to 120 GB	15 GB to 120 GB
Interfaces		Parallel ATA [Ultra ATA/66]		
Transfer mode		PIO mode0-4 / Multiword DMA mode 0-2 / Ultra DMA mode 0-5		
Operating voltage		5.0V±10%		
Operating temperature	Standard	0°C to 70°C		
	Wide temperature	-25°C to 85°C		-40°C to 85°C
Storage temperature		-45°C to 90°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 95% (no condensation)		
Dimensions (mm)		69.85 x 99.5 x 9.5		
DRAM cache		●	●	●
Maximum transfer rate	Sequential reading (MB/s)	75	70	80
	Sequential writing (MB/s)	75	75	60
	Random reading (IOPS)	4,500	5,000	5,500
	Random writing (IOPS)	7,500	7,500	9,000
Power consumption	Read (max.)	200	185	235
	Write (max.)	260	200	230
	Idle mode	115	115	125
Warranty period		1 year		

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
Q-MLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●
SLC	●	●	●	-	-	●	●	-	-	●	-	-	●	●	●	●

●: Onboard ○: Optional

*Refer to page 36

Exterior diagram



(Units: mm)

Product number

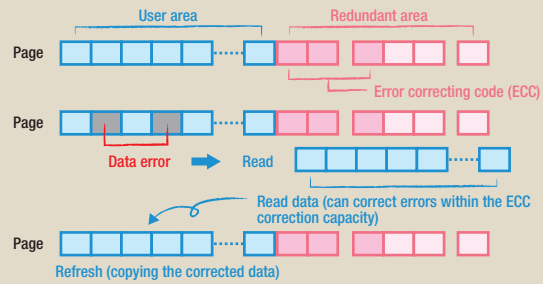
	MLC	Q-MLC	SLC
Standard 0°C to 70°C	LFD25P-xxxGD (A**AH)	XFD25P-xxxGD (A**AH)	HFD25P-xxxGD (A**AE)
Wide temperature -25°C to 85°C	LFD25P-xxxGD (A**AHS	XFD25P-xxxGD (A**AHS	-
Wide temperature -40°C to 85°C	-	-	HFD25P-xxxGD (A**AEI

Refresh function

Even if data retention is degraded due to repeated reads at a specific area (block), the data will be automatically relocated to another block before read error occurs, preventing data miscompare.

Data error correction via ECC

When saving data in NAND, the error correcting code (ECC) is also saved together with the user data. Data errors inside the ECC correction capacity can be corrected by the ECC circuit, but if the errors are beyond this capacity, no correction can occur: this is an "uncorrectable error." With the refresh function, when a block over the number of data errors is found, the data is copied to another block to recharge it.



Converts a 2.5-inch SATA device into a PATA interface

3.5-inch PATA-SATA Conversion Unit

Equipped with a bridge board for PATA-SATA conversion in a 3.5-inch sized frame, enabling a 2.5-inch SATA device to serve as a 3.5-inch PATA drive.

For 3.5-inch PATA HDDs now in limited supply

- New PATA interface drives are difficult to find now. These are perfect for these items in limited supply.
- This bridge board connects SATA devices to the higher PATA host, without requiring any special software for the connection.

Able to acquire S.M.A.R.T information

- Can obtain S.M.A.R.T. information for recommended SSDs, to enable preventive maintenance asking the user to replace it with a new device when the product life is near to expiring.
- Can prevent system damage due to the HDD with preventive maintenance and highly reliable SSDs.

Addition of a bridge board model to our lineup

Product name	PATA-SATA conversion board Type A (bridge board model)	PATA-SATA conversion board Type A (3.5-inch bay model)
Product number	PS-STD-J1	PS-STD-U35J
Host interface	ATA (IDE): ATA/ATAPI 7 compliant (40-pin connector) Transfer mode: PIO Mode 0-4 Multi Word DMA Mode 0-2 Ultra DMA Mode 0-6	
Compatible drives / interfaces	2.5-inch SATA Gen 1 (1.5 Gbps) SSD / HDD * SATA Gen 2 (3.0 Gbps) / Gen 3 (6.0 Gbps) SSDs and HDDs can also function, but will do so at 1.5 Gbps.	
Operating environment	Temperature: 0°C to 7°C. Humidity: 8% to 80%	

SD to FD Conversion Drive

A conversion drive allowing an SD card to serve as a floppy disk

Can be installed as it is in the drive bay for a floppy disk drive.
Dedicated SD cards can serve as floppy disks.

* Requires a dedicated SD card formatted as a floppy disk.
  Our dedicated SD card models are compatible for this.

The drive is interchangeable with 3.5-inch FD drives

Can connect with 34-pin FDD interface

The computer recognizes it as an FD drive

Lineup now includes items compatible with PC9801/1.2 MB

Product number	HPC-FDS01ADS	HPC-FDS02ADS	HPC-FDS03ADS	HPC-FDSFT01
Content	SD → FD conversion drive + SD card and FD format set	SD → FD conversion drive + SD card and FD format set	SD → FD conversion drive + SD card and FD format set	SDFDIMG Tool for format conversion
Format specifications	PC9801 format 1.44 MB format compatible	PC9801 format 1.2 MB format compatible	PC/AT transposition 1.44 MB format compatible	Dedicated software

Portable SSD with BitLocker-compatible Security Function

In Development

A portable external SSD supporting USB connection and hardware encryption with BitLocker.

(Image of product in development)

BitLocker

This feature is gaining attention for its ability to conveniently protect data in the increasingly popular Windows 10 with encryption functions of the Windows operating system.

Compatible with hardware encryption by BitLocker

Our original technology allows encryption inside the SSD (hardware).
Reduces the load on the computer and allows smooth data migration.

Equipped with highly reliable storage with fixed specifications for the primary parts

Equipped with our own SDD with a fine track record. Specifications for controllers, flash memory, and firmware are fixed, to realize stable supply.

USB 3.0 compatible

The USB 3.0 standard enables high-speed data transfers.
Speeds are approximately ten times that of the previous USB 2.0 standard, supporting the performance of SSDs.

Compatible with LiveMonitor life diagnostic software

Predicts SSD product life and failure based on SSD self-diagnostic S.M.A.R.T. information. The results of this product life prediction allow preventive maintenance by replacing the SSD with a new one before its life expires.

Interface	USB 3.0
Power	Runs on USB bus power
Installation requirements	Horizontal
Dimensions	116.5 x 79.0 x 20.5 (mm) *
Mass	TBD
Temperature range for use	0 to 50°C
Humidity range for use	20 to 80% (no condensation)
Acquired standards	VCCI Class B, RoHS Directive compliant
Internal SSD	Hagiwara 2.5-inch SSD
Controller	SATA-USB conversion bridge controller
Case material	Plastic, rubber *
Life diagnostics	Life diagnostics tool compatible
Status LED	Yes (lit = power is on, unlit = power is off, flashing = accessing)
Accessories	USB cable USB 3.0 micro-B ⇔ USB 3.0 Type A

* Subject to change.

Product capacity	30 to 960 GB *
Transfer rate (Read)	Max. 400 MB/s
Transfer rate (Write)	Max. 400 MB/s

* Limited by the host-side supply current

USB Memory USB 3.0 Model

Fixed parts (compact) model
Fixed specifications model
Fixed specifications (compact) model

USB 3.0

Flash memory		Compact/Fixed Parts MLC	Compact/Fixed Specifications MLC	Fixed Specifications MLC	Compact/Fixed Parts SLC
Capacity		4 GB to 32 GB	4 GB to 32 GB	4 GB to 32 GB	2 GB to 16 GB
Interfaces		USB 3.0 (Super Speed) / USB 2.0 (High Speed) / USB 1.1 (Full Speed)			
Operating voltage		5.0V±5%			
Operating temperature		0°C to 70°C	0°C to 50°C	0°C to 50°C	0°C to 70°C
Storage temperature		-20°C to +85°C			
Operating humidity		To 85% (no condensation)			
Storage humidity		To 85% (no condensation)			
Dimensions (mm)		43.3 x 17.0 x 8.00		62.1 x 17.0 x 8.00	43.3 x 17.0 x 8.00
Maximum transfer rate (USB 3.0)	Sequential reading (MB/s)	145	145	145	40
	Sequential writing (MB/s)	37	37	37	30
Power consumption	Read (max.)	210	210	210	220
	Write (max.)	210	210	210	220
	Idle mode (max.)	130	130	130	130
Warranty period		1 year			

* Fixed parts: all parts and firmware excluding CR are fixed.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
Compact/Fixed Parts MLC	●	-	-	-	-	●	●	-	-	●	-	-	-	●	●	-
Compact/Fixed Specifications MLC	●	-	-	-	-	●*	●	-	-	-	-	-	-	-	-	-
Fixed Specifications MLC	●	-	-	-	-	●*	●	-	-	-	-	-	-	-	-	-
Compact/Fixed Parts SLC	●	-	-	-	-	●	●	-	-	●	-	-	-	●	●	-

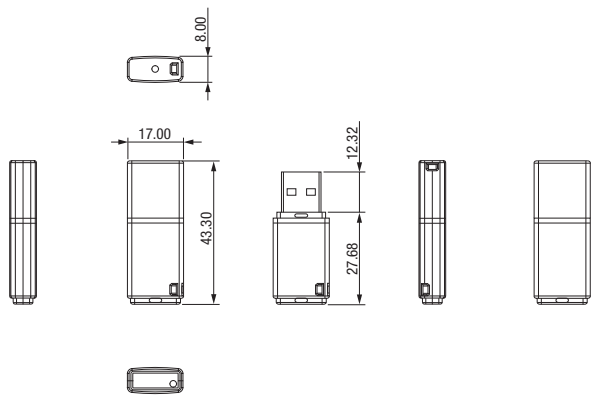
●: Onboard ○: Optional
*Refer to page 36

* Controller/NAND flash processes and firmware are fixed.

Product number

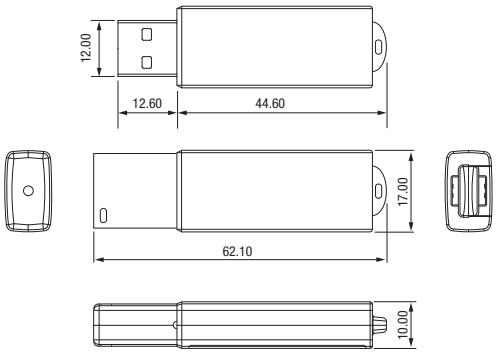
	Compact/Fixed Parts MLC	Compact/Fixed Specifications MLC	Fixed Specifications MLC	Compact/Fixed Parts SLC
Operating temperature 0°C to 50°C	-	USB3-xxxGH (B00MH)	UBB3-xxxG0 (B00MH)	-
Operating temperature 0°C to 70°C	USA3-xxxGH (B00MH)	-	-	USA3-xxxGH (B00SE)

EXterior diagram (compact model)



(Units: mm)

Exterior diagram



(Units: mm)

USB Memory USB 2.0 Model

Fixed parts model
Fixed specifications model

USB 2.0

Flash memory		Fixed Parts MLC	Fixed Specifications MLC	Fixed Parts SLC
Capacity		2 GB to 64 GB	4 GB to 64 GB	128 MB to 32 GB
Interfaces		USB 2.0 (High Speed) / USB 1.1 (Full Speed)		
Operating voltage		5.0V±5%		
Operating temperature		0°C to 70°C	0°C to 50°C	0°C to 70°C
Storage temperature		-20°C to +85°C		
Operating humidity		To 85% (no condensation)		
Storage humidity		To 85% (no condensation)		
Dimensions (mm)		62.1 x 17.0 x 8.00		
Maximum transfer rate	Sequential reading (MB/s)	26	26	25
	Sequential writing (MB/s)	14	14	20
Power consumption	Read (max.)	100	100	90
	Write (max.)	100	100	90
	Idle mode	50	50	40
Warranty period		1 year		

* Fixed parts: all parts and firmware excluding CR are fixed.

	Static Wear Leveling	Refresh Function	Read Retry Function	Power Loss Guard	Offline Scan	Fixed Specifications	RoHS-compatible	FDE (Encryption)	TCG Opal 2.0	Life-indicating Function	Product Life-detecting LED	DevSleep Function	Power Interruption Resistance	Wide Temperature	Environmental Documentation	LiveMonitor
Fixed Parts MLC	●	-	-	-	-	●	●	-	-	●	-	-	-	●	●	-
Fixed Specifications MLC	●	-	-	-	-	●*	●	-	-	-	-	-	-	-	-	-
Fixed Parts SLC	●	-	-	-	-	●	●	-	-	●	-	-	-	●	●	-

●: Onboard ○: Optional *Refer to page 36

* Controller/NAND flash processes and firmware are fixed.

Product number

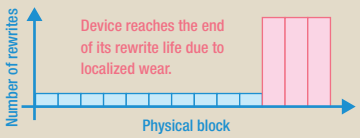
	Fixed Parts MLC	Fixed Specifications MLC	Fixed Parts SLC
Operating temperature 0°C to 50°C	-	UBB2-xxxG0 (A00MH)	-
Operating temperature 0°C to 70°C	UBA2-xxxGH (A00MH)	-	UBA2-xxxxSRB (TBAIA)

Static wear leveling function

Prolongs rewrite product life by preventing concentrated access to specific areas (blocks) and writing data evenly over the entire memory area.

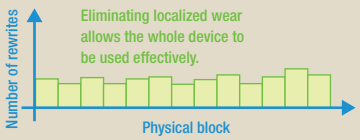
No wear leveling

Localized wear occurs between physical blocks. Blocks that reach the end of their rewrite life are substituted locally, but this results in a lack of spare blocks, resulting in product life soon being reached.



With wear leveling

Blocks are controlled to ensure uniform use, preventing localized wear and allowing effective rewriting.

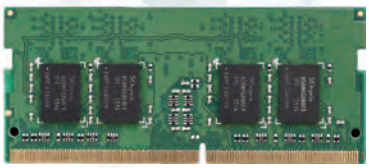


Enhanced custom menu

Case	▶ Silk / leather / inkjet printing ▶ Control number / serial number printing ▶ Attachment of control number sticker
Device setting	▶ Data writing ▶ Setting as CD-ROM ▶ Custom serial number
Other	▶ Submits serial number list ▶ Custom packaging

Memory Module

DDR4 SDRAM
DDR3 SDRAM
Synchronous



DDR4 SDRAM

	SO-DIMM				U-DIMM			
ECC/nonECC	ECC		Non ECC		ECC		Non ECC	
SPEED	PC4-19200	PC4-17000	PC4-19200	PC4-17000	PC4-19200	PC4-17000	PC4-19200	PC4-17000
Data rate	2400 MHz	2133 MHz	2400 MHz	2133 MHz	2400 MHz	2133 MHz	2400 MHz	2133 MHz
Density	4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB		4 GB, 8 GB, 16 GB	
DRAM	Samsung		Samsung		Samsung		Samsung	
Pins	260 pin		260 pin		288 pin		288 pin	
Height	30 mm		30 mm		31.25 mm		31.25 mm	
Supply voltage	1.2V		1.2V		1.2V		1.2V	
Operating temperature	0 to 85°C		0 to 85°C		0 to 85°C		0 to 85°C	
Part number	GN19NxxGE-S5819L *	GN17NxxGE-S5819L *	GN19NxxGN-S5819L *	GN17NxxGN-S5819L *	GD19NxxGE-S5819L *	GD17NxxGE-S5819L *	GD19NxxGN-S5819L *	GD17NxxGN-S5819L *

* Hagiwara control information

DDR3 SDRAM

	SO-DIMM		U-DIMM	
ECC/nonECC	ECC	Non ECC	ECC	Non ECC
SPEED	PC3L-12800		PC3L-12800	
Data rate	1600 MHz		1600 MHz	
Density	2 GB, 4 GB	2 GB, 4 GB, 8 GB	2 GB, 4 GB	2 GB, 4 GB, 8 GB
DRAM	Samsung		Samsung	
Pins	204 pin		240 pin	
Height	30 mm		30 mm	
Supply voltage	1.35V/1.5V		1.35V/1.5V	
Operating temperature	0 to 85°C		0 to 85°C	
Part number	FN12N-xxGE (S*814L *	FN12N-xxGN (S*814L *	FD12N-xxGE (S*814L *	FD12N-xxGN (S*814L *

* Hagiwara control information

Synchronous

	SO-DIMM	U-DIMM	
ECC/nonECC	Non ECC	Non ECC	
SPEED	PC133	PC100	PC133
Data rate	133 MHz	100 MHz	133 MHz
Density	128 MB, 256 MB	256 MB, 512 MB	
DRAM	Winbond	Micron	
Pins	144 pin	168 pin	
Height	29.21 mm	29.21 mm	
Supply voltage	3.3V	3.3V	
Operating temperature	0 to 70°C	0 to 70°C	
Part number	SN13F-xxxN (W*613H *	SD10F-xxxN (M*813H *	SD13F-xxxN (M*813H *

* Hagiwara control information

Differences between products designed for embedding and retail products

	Products designed for embedding (SLC)	Retail Products
Applications	For writing applications e.g. OS/app storage or saving logs	For ordinary users e.g. smartphones/tablets
Rewrite product life	◎ 50,000 to 100,000 times per block	× No guaranteed figures Actual value of several hundred times or less
Data retention	◎ 10 years after writing 1000 times	× Half a year or less after writing 1000 times
Quality	◎ For embedding specifications, NAND initial defect rate is further reduced through burn-in testing. Stable operation is achieved.	× Parts are selected at different times Quality is unstable
Supply period	◎ 1 process approx. 2-3 years	× No guarantee of supply period
Support	◎ Before introduction: technical support from the product development stage After introduction: analysis reports of operating errors and suggestions to prevent recurrence.	× If a problem occurs, the only solution is replacement

Main examples of problems with retail products

CASE-1

Problem

Frequent problems arise within 1 year after beginning of use.

Cause

Product quickly reaches its lifespan and can no longer be used.

Machine tools

CASE-2

Problem

Differences from one product to another, despite having the same model number. This leads to identification problems and operating errors.

Cause

The specifications were not fixed, so even though the products looked similar, they were different on the inside.

Medical instruments

CASE-3

Problem

Sudden production halts require work to evaluate replacement products. This occurs not just unexpectedly but also frequently.

Cause

The supply period is not guaranteed, making it hard to indicate in advance when sales will end.

Automotive equipment

CASE-4

Problem

Requested product support to the manufacturer, but they only replace the parts, causing the problem to become long-term.

Cause

Because this is a retail product, the manufacturer had no system in place for analysis and support.

Manufacturing equipment

Problems like the ones above do not occur with products designed to be embedded.

Virus check tool for offline devices with a full range of management functions

Vaccine USB3

You can connect it to on offline device to run a virus check on-demand.
This is a new model virus check tool in the form of a USB flash drive equipped with a McAfee virus scan engine.
It greatly enhances your management functions, such as operational management or keeping track of offline device assets.

Key features of Vaccine USB3

USB flash drive-type virus check tool

This is a virus check tool equipped with a McAfee virus scan engine.
It can delete or quarantine any viruses it detects, handling virus checks for a single or multiple devices.

The user interface of the Vaccine USB3 is based on that of Vaccine USB2, making for easy migration.

Check the results on the flash drive's LED lights

You can check the results of the virus check with the red and blue LED lights on the flash drive.

No virus infection　　Virus infection

Greatly shortens virus checking times

A differential scan function looks only at files that changed or were newly added since the last virus check, greatly shortening the time needed for the check.

Scan results saved as a log

The results of the virus check are safely stored in a special memory area on the flash drive as log data.

Enables time-saving license renewal

Licenses are managed on our servers, so there is no need to go through a process to extend the licenses of your individual products.

New function

Timer scan function

With this function, just connect the flash drive to a device to run virus checks on specified dates and times. You can set the dates and times as a weekday (Monday to Sunday + start time, or a specific date + start time.

Asset information collecting function

This function acquires detailed information on assets in the device. It acquires detailed information on hardware and on installed apps, and saves this as a log on the flash drive. This is effective for collecting information on offline device assets which do not have asset management software.

Cloud service linkup New function

Intensive operation management function

This service enables intensive management of the operating status of the product in the cloud, so that you can determine the results of virus checks remotely. As it's a cloud service you can start small, and control these flash drives in sites inside Japan or overseas.

* You must have a separate contract for the paid service of INFO BANKER Cloud.

File acquisition function (Name of service: INFO BANKER Cloud Storage)

With this function you can collect in the flash drive files saved on devices you want to check for viruses, and upload them to a cloud service. It collects files for virus checks and to create logs for the devices, so it can be used for intensive management for operating logs of devices and for visualization in factories.

* You must have a separate contract for the paid services of INFO BANKER Cloud / INFO BANKER Cloud Storage.

Vaccine USB3	
1-year license model	ULD-VAU31A
3-year license model	ULD-VAU33A
5-year license model	ULD-VAU35A

License extension pack (1-year license extension / with hardware guarantee)	
1 pack	ULD-VAU31RA
10 packs	ULD-VAU310LR

Compatible operating systems

Win 10 / 8.1 / 8 / 7 / Vista SP2 / XP SP3 / XPEmb SP2 / Emb Standard 2009 / Emb7 Standard / Emb POS Ready7 / server 2012 / server 2012 R2 / server 2008 SP2 / server 2008 R2 SP1 / server 2003 SP2 / server 2003 R2 SP2

* Has several types of usage restrictions. Please view our website for details.
* Check our website for the latest information on the support period for Windows SP3.
* The display will be in English in non-Japanese operating system environments.

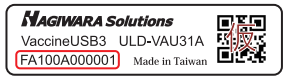
License renewal

License renewal procedure

You can see the latest information and download the required application form for Vaccine USB2 license renewal on our website.
▶ **http://www.hagisol.co.jp/products/offline/license.html**

Vaccine USB3

Customer	Hagiwara Solutions	Customer
STEP1 Please purchase the license extension pack.	STEP5 The license server is updated in our company.	STEP6 The license certificate is sent to you be email. * Store the license certificate in a safe place.
STEP2 Please download the application form from our website.		
STEP3 Enter the license number enclosed in the license extension pack, the 12-digit serial number on the back of the actual product, and other required details in the application form.		
STEP4 Please send the application form by email to the specified email address.		



* Staff in charge of using the Vaccine USB3 do not have to do any special tasks for the sake of license renewal.

Vaccine USB3 Migration Campaign

For customers currently using Vaccine USB1 or USB2, we have a campaign where you can migrate to Vaccine USB3 for a price equal to a normal license renewal pack.
▶ **http://www.hagisol.co.jp/products/vusb3-campaign.html**

Customer	Hagiwara Solutions	Customer
STEP1 Please purchase the migration pack.	STEP5 We will check the application form you send us and inform you by email of the intended date to send the results of our check and the Vaccine USB3.	STEP7 Migrate to Vaccine USB3 within a month of receiving it.
STEP2 Please download the campaign application form from our website.	STEP6 We will send the Vaccine USB3 to the address written on the application form.	* Approximately a month after the Vaccine USB3 is sent, you will no longer be able to update the definition files for the Vaccine USB1 or USB2 you wish to migrate from as stated in your application.
STEP3 Enter the campaign number enclosed in the migration pack, the serial number of the USB1 or USB2 you wish to migrate from, and other required details.		
STEP2 Please send the application form by email to the specified email address.		

Campaign application period: by March 29, 2019

Security USB

Virus check function

Performs a virus check of files written in the USB flash drive.

Any viruses found are instantly eliminated. Prevents you from carrying infection files.

Simple virus check of the host computer

Runs a check to see if active processes in the connected host PC are infected. Users are informed by an onscreen message if a virus is found (goes as far as virus detection).

Local update function

Virus definition files can be provided via the Internet or via in-company servers or McAfee VirusScan Enterprise installed on the computer.

Data breach safeguard function

Password lock function

Access to the user's domain is denied until the password is authenticated.

Hardware automatic encryption function

All files written to the USB flash drive are automatically subject to AES 256-bit encryption. Data cannot be read just by removing the flash drive.

Operation management function

Automatic software update

When the latest software becomes available, your software will be automatically updated through the silent update feature (setting required for administrator software).

Automatic license renewal

Users of USB flash drives with virus check functions only have to submit the application form for the license to automatically renew, without having to do any other action. (The USB flash drive must be used in an environment able to connect to the Internet for the license renewal to take place.)

Administrator software compatible

Compatible with INFO BANKER

Collection of log information for the relevant products allows early countermeasures and tracking of operation management, virus infections, lost data and so on.

Compatible with Security USB Manager

Optional software for administrators allows the settings of the security USB flash drives to be customized according to corporate security policies.

Model with antivirus safeguard (equipped with a McAfee antivirus engine)

Win ※1 | 10 | 8.1 | 8 | 7 | Vista SP1~SP2 | XP SP3 | server 2012 | server 2012 R2 | server 2008 SP2 | server 2008 R2 | server 2003 SP2 | server 2003 R2 SP2 | XPEmb SP2 — Mac ※1,※2 | 10.4~10.12 — Virus check function does not run on Mac OS.

HUD-PUVM3M series

UDRW Technology — USB3.0 — 2 to 64 GB / 128GB

McAfee

Model for administrator software

Password lock function | Virus check function | Administrator software compatible | No cap | User permission settable | Automatic encryption function | Automatic license renewal | Automatic software update | Autorun.inf countermeasure function | No installation required

Product lineup 2 GB to 128 GB "xx" shows the product's capacity.

License and hardware guarantee period	Product number
1-year license model	HUD-PUVM3xxGM1
3-year license model	HUD-PUVM3xxGM3
5-year license model	HUD-PUVM3xxGM5

HUD-PUVM3A series

UDRW Technology — USB3.0 — 2 to 64 GB / 128GB

McAfee

Standard model

Password lock function | Virus check function | Administrator software compatible | No cap | User permission settable | Automatic encryption function | Automatic license renewal | Automatic software update | Autorun.inf countermeasure function | No installation required

Product lineup 2 GB to 128 GB "xx" shows the product's capacity.

License and hardware guarantee period	Product number
1-year license model	HUD-PUVM3xxGA1
3-year license model	HUD-PUVM3xxGA3
5-year license model	HUD-PUVM3xxGA5

Renewal license

The virus check function contains settings for the license period. For continued use of the virus check function, you must extend the license.

We have two types of license extensions, convenient for people using multiple USB flash drives. Automatic extension helps ensure your license will be properly extended and reduces the amount of work needed by the USR flash drive user to do so.

1-year extended license	Product number
Renewal license (1-year guarantee)	HUD-PUVM1L
Renewal license + hardware guarantee (1-year guarantee)	HUD-PUVM1LA

Renewal with the same license key | Automatic license renewal

* The hardware warranty is for up to 5 years from the purchase date.

Data Breach Safeguard Model (Password Locker 4)

Win ※1 | 10 | 8.1 | 8 | 7 | Vista SP1~SP2 | XP SP3 | 2000 SP3~SP4 | server 2012 | server 2012 R2 | server 2008 SP2 | server 2008 R2 | server 2003 SP2 | server 2003 R2 SP2 | XPEmb SP2 — Mac ※1,※2 | 10.4~10.12

Password Locker 4

UDRW Technology — USB3.0 — 2 to 64 GB / 128GB

Password lock function | Virus check function | Administrator software compatible | No cap | User permission settable | Automatic encryption function | Automatic license renewal | Software Automatic update | Autorun.inf countermeasure function | No installation required

Product lineup 2 GB to 128 GB "xx" shows the product's capacity.

Product number
HUD-PL3xxGM

1. The display will be in English in non-Japanese operating system environments.
2. Some of the following functions will not operate: software automatic update, log save/output/viewing, Autorun.inf automatic deletion, option setting, copy guard, security USB manager.
3. Part of the memory capacity of this product is used as a management domain, hence the actual usable capacity will be smaller than that shown.
4. Please confirm on our website the support periods for Windows 2000 and Windows XP.

10Key Security USB

10KEY SECURITY USB

Product lineup 8 GB

Product number
HUD-PUTK308GA1

Operating system-independent Data Breach Safeguard USB Flash Drive

Use the numerical keypad on the flash drive to release the password lock!
This USB flash drive contains automatic AES 256-bit hardware encryption.

Product features

Operating system-independent
Usable on devices supporting USB flash drives*

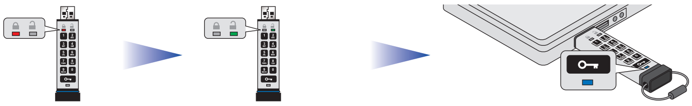
Data breach safeguard
Access restricted with password authentication and automatic AES 256-bit encryption

High protection performance
Highly water- and dust-proof aluminum body

* We cannot guarantee it will work with all devices.

The USB flash drive has a physical numerical keypad on it. Use this to enter the password and unlock it. This allows it to be used with special devices such as machine tools that have no keyboard. There is no need for password authentication by software, allowing this USB flash drive with security features to be used across a wide range of devices, independent of the operating system of the device.

Use the numerical keypad on the flash drive to enter the password and unlock it.



Password input
Input the password using the numerical keypad on the product.

Password unlocking
Connect to the USB port of the device

Recognized as an ordinary USB flash drive
The software is not used for password authentication, so it does not exist in the operating system of the device.

Custom menu

Kitting service
We deliver our Security USB Manager software for administrators with settings applied for you.

Control number tool
Delivered with a printed sticker showing the information you specify. Also works for printing serial numbers.

Submission of serial number list
We can submit a list of data linking the serial number and the USB's internal serial on the nameplate.

Customizing serial numbers
You can customize part of the USB's internal serial number.

Operation management server software and services for virus check tools / security USB memories

INFO BANKER

Collection of log information for the relevant products allows early countermeasures and tracking of operation management, virus infections, lost data and so on.

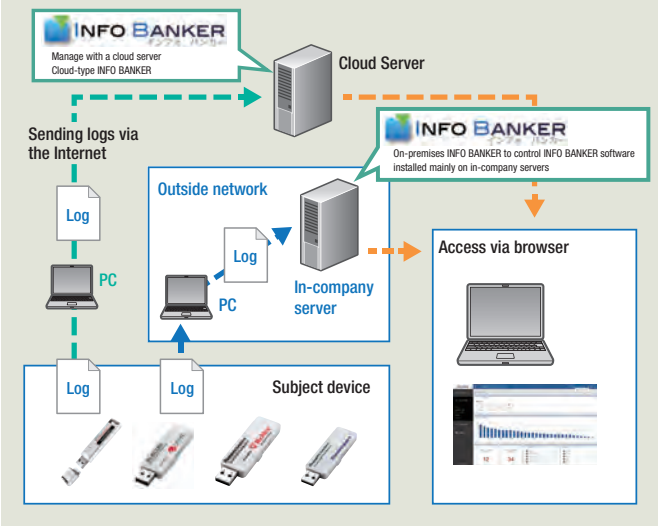
Provided in two ways

On-premises type

This model is used by installing INFO BANKER on the customer's server.
(Compatible operating systems: Windows Server 2008/2008 R2/2012/2012 R2)

Cloud-type

This model manages the operating status on a cloud server.
Can check the operating status via a browser without having to have server available.



Function

Information on the subject devices / Operation management function

Information on devices (e.g. computers) that used the subject devices
Information on the subject devices
Virus check results
License information
History of file operations (e.g. copying, deletion, etc.) in security USB flash drive

Report function

Total number of viruses detected in units of days. List of subject devices with high numbers of viruses detected (top 5)
List of devices (e.g. computers) with high numbers of viruses detected (top 5)
List of subject devices used very few times
List of subject devices where files were used frequently
List of subject devices with licenses due to expire within a month
Inventory of subject devices, etc.

* The on-premises version only provides a report on information for viruses detected in units of months.

Remote use stop function

Prohibits use of specified security USB flash drives

Email notification function when a virus is detected

When a log of a virus detected from the subject device is received, automatically an alert email is sent to the specified address

Reception for Cloud-type evaluation version
URL https://www.infobankercloud.com

Product name	License period	Number of licenses	On-premises model number	Cloud-type model number
INFO BANKER (*1)	–	–	HUD-IF100H	HUD-IFC1A
Annual support license	1 year	–	HUD-IF100H1S	HUD-IFC1S
Annual device license (For Security USB) (*2)	1 year	10 license	HUD-IFH0010LS	HUD-IFC0010LS
	1 year	50 license	HUD-IFH0050LS	HUD-IFC0050LS
	1 year	100 license	HUD-IFH0100LS	HUD-IFC100LS
Annual device license (For Vaccine USB2 / Litmus USB2) (*2)	1 year	10 license	HUD-IFH0010LV	HUD-IFC0010LV
	1 year	50 license	HUD-IFH0050LV	HUD-IFC0050LV
	1 year	100 license	HUD-IFH0100LV	HUD-IFC0100LV

(*1) The cloud account is for account creation expenses. Purchase of the required number of accounts is necessary.
(*2) Purchase of yearly device licenses for the number of devices to be managed by INFO BANKER is required at the start of the license.

Optional software for administrators allows the settings of the security USB flash drives to be customized according to corporate security policies.

Security USB Manager

Security USB Manager
HUD-SUMA

Win 10 8.1 8 7 SP1 Vista SP2 XP SP3

* Only compatible with 32-bit for Windows XP.
* Supports both Japanese and English.

Compatible models

Password Locker 3	HUD-PUVMM series	HUD-PUVSM series	MF-PUVTM series
Password Locker 4	HUD-PUVM3M series	HUD-PUVS3M series	MF-PUVT3M series

Customize the password authentication function

Setting a password policy
Users can customize their password policies e.g. the number of digits or number of retries.

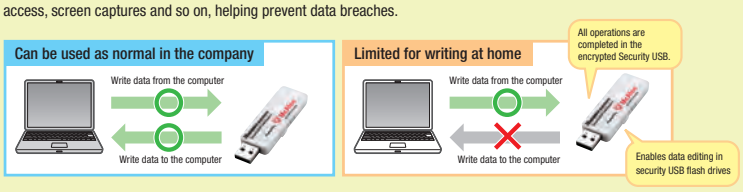
Data rescue function
If you forget the password of the security USB flash drive, and even if are locked out by exceeding the number of allowed retries, your precious data saved inside the flash drive can still be retrieved.

Enforces operating rules with various types of restrictions

Make the security USB flash drive only usable on a specific computer
Conditions such as the availability of certain files and folders can be set, to limit use to computers meeting the said conditions.

Set the usable period
The usable period can be set in units of days, allowing the administrator to lend out the security USB flash drive for use.

Copy guard function enabling secure editing of files on computers outside your company
When the copy guard function is enabled, users can edit files saved on security USB flash drives on a computer outside their company, but cannot save them on that computer. Other restrictions can be placed prohibiting printout, Internet access, screen captures and so on, helping prevent data breaches.



Can be used as authentication device and dedicated data delivery/receiving tool

UDRW G5

The UDRW G5 is a special USB flash drive with a secure area not recognized by the CD-ROM area or operating system. Using a software development kit (SDK) allows development of software linked to UDRW G5.

UDRW G5 function

CD-ROM area
A USB flash drive that is also a CD-ROM drive. It can prohibit tampering, automatically execute software, and boot operating systems.

AES 256-bit encryption
Protects customer data by automatically encrypting data in the memory.

Secure area
The USB flash device contains areas the user cannot see. Authentication keys, logs, and other items you do not wish the user to see can be saved.

Rewrite product life
Equipped with MLC NAND flash memory, which has a long rewrite product life.

Product lineup

There are 3 models of UDRW G5 devices.

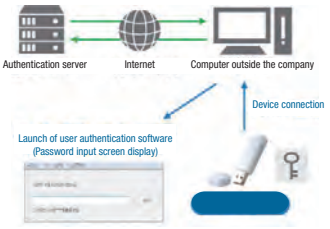
Product lineup 4 GB to 32 GB "xx" shows the product's capacity.

Product name	Product number	Drive configuration
UDRW G5 boot CD model	UDG5-xxGCUCJ	CD-ROM + secure area (boot compatible)
UDRW G5 CD model	UDG5-xxGCUCHJ	CD-ROM + secure area
UDRW G5 CD + memory model	UDG5-xxGCUCRHJ	CD-ROM area + removable + secure area

Main examples of use

Commercialized as an access key

UDRW is used as an access key for safe remote operation of company computers from outside the company. By storing the viewer program set to auto-run in the CD-ROM area and storing an authentication key unique to the device in the secret area, just by simply inserting the UDRW into the computer's USB port automatically displays the viewer program authentication screen. If the user enters the correct password, the authentication key in the secure area is recognized and secure communication is established by connecting to an authentication server.



UDRW G5 SDK (development kit)

A software development kit (library) is available for UDRW G5, adding functions to control UDRW G5 in software. By using the development kit, you can access the secure area of UDRW G5, write data to the CD-ROM area, and build your own dedicated software and systems.

UDRW G5 SDK has a lineup for Windows, Mac OS X, and Linux.

Items	UDRW G5 SDK Windows	UDRW G5 SDK Mac OS X	UDRW G5 SDK Linux
Library-supporting operating system	• Windows XP SP3 (32bit) • Windows Vista SP2 (32bit/64bit) • Windows 7 SP1 (32bit/64bit) • Windows 8 (32bit/64bit) • Windows 8.1 (32bit/64bit) • Windows 10 (32bit/64bit)	• MaxOSX10.7.5 • MaxOSX10.8.5 • MaxOSX10.9.3	• Ubuntu 12.04 (32bit) Kernel Version: 3.2.0/3.8.0 • Knoppix 7.0.2 Kernel Version: 3.3.2
Supported language	C++, C++.NET, C#.NET, VB.NET	C, C++, Objective C++	C, C++
Development environment	Visual Studio 6 Visual Studio 2005 or later	Xcode 3.1.2 or later	gcc
Supported device	• CD-ROM area + RAM area + secure area • CD-ROM area + secure area • CD-ROM area + secure area (boot CD model)	• CD-ROM area + secure area	• CD-ROM area + secure area (boot CD model)

Read-only USB flash drive able to be used as a CD-ROM

CDMemory2

This is a special USB flash drive that is recognized as a CD-ROM and can only be written with dedicated writing software.

Using the properties of CD-ROMs, it erases data tampering or errors and prevent virus infections, yet has a file transfer rate faster than a CD-ROM. It can also be used as an alternative to a physical CD-ROM for devices that cannot otherwise incorporate one.

Product lineup 4 GB to 32 GB "xx" shows the product's capacity.

Model	Capacity	Product number
USB 2.0 model	4 GB	HUD-CDM2-xxGU2A
USB 3.0 model	8 GB/16 GB/32 GB	HUD-CDM2-xxGU3A

Dedicated writing software

The lineup includes CDM2 Writer, which can be obtained by downloading and can write data in single units, and CDM2 Kitting Tool, an optional app that can save write logs.

Product name	Product number
CDM2 Kitting Tool	HUD-CDM2-KT100A

* The "xx" part of the product model number shows its capacity.

Explanation of original features

Wide-ranging lineup

We have three levels to meet the requirements of the customer.

Red-series SLC — Stability and a super-long product life with stronger power interruption resistance

Blue-series Q-MLC — High-speed access and approximately 10 times the rewrite service life of MLC

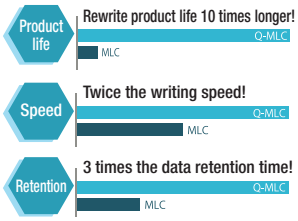
Green-series MLC — Data reading optimized for the main system

The Q-MLC transfer rate is faster than SLC/MLC (especially for random access)!

	Bit unit price	Data reliability	Rewriting product life	Transfer rate			
				Sequential		Random	
				Read	Write	Read	Write
SLC	△	◎	◎	○	○	△	○
Q-MLC	○	○	○	◎	◎	◎	◎
MLC	◎	△	△	◎	△	○	○

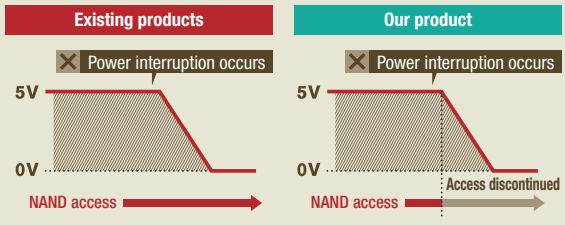
Quality-MLC

Compared to MLC



Power interruption measures

These days SSDs for industrial equipment are used in a variety of systems. Depending on the system, the SSD end sequence may not run properly, cutting power to the system when it is being accessed (e.g. being written to). Power interruptions to NAND flash memory programs or during erasure leads to lowered data retention, possibly causing disk malfunctions. Our SSDs stop writing during power interruptions, preventing damage to the disk.



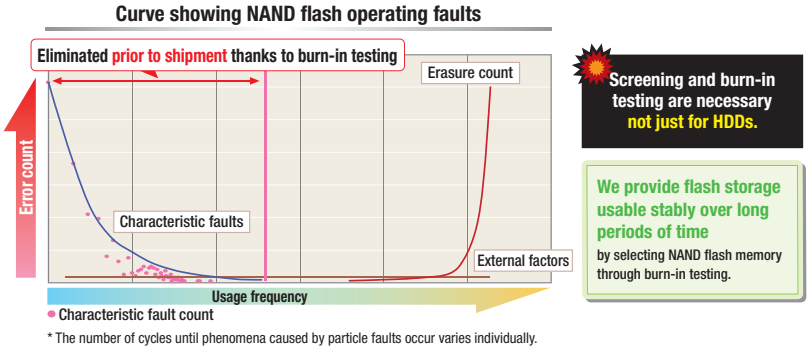
When voltage is detected to be falling due to power interruption, access to NAND flash memory is stopped. This prevents the device crashing.

Extended maintenance service

SSDs have a higher level of physical and environmental tolerance compared to HDDs. They are used in harsh environments and places where reliability is essential. Using our technology development capabilities honed over many long years in the flash storage field (such as with SSDs for industrial equipment), we have prepared our Rest-easy Long-term Maintenance Pack to provide extended maintenance services supporting steady operation of storage products over long periods of time.

Burn-in testing minimize particle faults that can lead to initial defects.

Particles are tiny pieces of foreign objects that become attached to the wafer during the manufacturing process. The impact on functioning (quality) due to particle faults accompanying process shrink (miniaturization) cannot be ignored. Particles cause random faults at the semiconductor level. The main effects on SD cards are loss of stored data or lowered transfer rates. Burn-in testing reveals particles, preventing acquired operating faults in advance.



* The number of cycles until phenomena caused by particle faults occur varies individually.

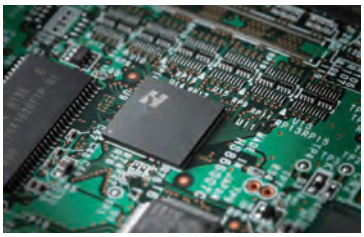
Rest-easy Long-term Maintenance Pack

Hagiwara Solutions supports long-term operation with peace of mind.

Reassuring long-term backup support

Sendback extended maintenance program

The maintenance period can be extended to a maximum of six years. If a breakdown does occur during the warranty period, we will provide a substitute (the same product, or one with similar specifications) at no cost, shipped by the next day.
*Details will depend on the terms and conditions of your agreement.



Diagnostic support only a manufacturer can provide

Disk diagnostic program

If you notice something strange about the disk, you can check for a problem with the disk diagnostic program. If a malfunction in the disk is found, a diagnostic report is issued based on your record and the disk.

Helping you when you most need help

Engineering support program

A total support program that solves a lack of user analytical and assessment resources (e.g. analysis using Bus Analyzer or Compliance Tester, reliability testing using a thermostatic oven). Purchasers of the Rest-easy Long-term Maintenance Pack can use this for a discounted price during their maintenance period.

Details of feature/function icons

Static wear leveling

Prolongs the rewrite product life by preventing concentrated access to specific areas (blocks) and writing data evenly in the memory area.

Offline scan

This function operates in the background to re-arrange the blocks with degraded data to maintain retention. It suppresses the frequency of corrupted data from long-term operation and prevents system shutdown.

RoHS compliant

This product complies with the European Union's RoHS Directive, which limits the use of hazardous substances.

FDE (encryption)

The entire SSD is automatically encrypted, protecting the computer's data with powerful security.

TCG Opal2.0

The high security functions of preboot authentication, security area segmentation, and centralized storage via remote are realized in the combination of application software compatible with Opal specifications.

Life-indicating LED

The red LED lights up when the remaining number of writes is limited. This allows users to visually see the SSD's life from the exterior.

Wide temperature

We provide products that have passed strict testing in order to realize stable functioning under harsh environments.

Environmental documentation

Because the product specifications and parts are fixed, environmental documentation (e.g. for RoHS or AIS) can be provided.

Refresh function

Even if data retention is lowered due to repeated reading of data at a specific area (block), the data will be automatically relocated to another block before data corruption occurs, preventing data miscompare.

Read retry function

Outputs data correctly even as the memory data retention capacity diminishes and read errors occur, by repeated access during reading.

Power loss guard function

To cope with power outages, memory access during a sudden power outage will be prevented on receiving a power shutdown notification signal from the host. This function prevents device breakdown and minimizes data loss.

Fixed specifications

Parts, controllers, and firmware are fixed, to realize stable operation.

Life-indicating functions

Allows drive failure prediction and checking of drive information when a failure does occur. Used together with LiveMonitor, the life diagnostics monitoring software, it allows users to check the status of the drive in real time and predict its product life.

DevSleep function

This function greatly reduces power consumption while the system is on standby.

Power interruption resistance

Our original recovery functions for sudden power interruptions or outages prevent damage to your devices.

LiveMonitor

Complies with LiveMonitor life diagnostics monitoring software.

Model Number Rules

SSD

H FD25 S - 240G D (A**A E)

NAND flash types
H: SLC
X: QMLC
L: MLC

Product types
FD10: Flash Drive 1.0”
FD25: Flash Drive 2.5”
FDHS: Halfslim
FDMS: mSATA
FDM2: M.2

Interface
S: SATA
P: PATA
E: PCIe

Operating temperature
): Standard product
S, I: Wide temperature

NAND flash process
E: 2x nm SLC
H: 1x nm MLC

Hagiwara control information

Controller types

Drive capacity
ex. 512M: 512 MB
ex. 240G: 240 GB

SD

NSD A - 001G S (A**A E I

Product types
NSD: SD Card
MSD: MicroSD

SD Speed Class
4: Class 4
6: Class 6
A: Class 10
B: Class 10/UHS-1

Drive capacity
ex. 512M: 512 MB
ex.128G: 128 GB

Operating temperature
S, I: Wide temperature

NAND flash process
E: 2x nm SLC
F: 1x nm MLC

Hagiwara control information

Product types
S: S series
K: K series

USB

UB A 3 – 004G H (A** S E)

Product types
UB: USB Memory
US: USB Memory (compact size)

Product types
A: Fixed parts
B: Fixed specifications for primary parts

Interface
2: USB 2.0
3: USB 3.0

Drive capacity
ex. 512M: 512 MB
ex. 128G: 128 GB

Product types
H: H Series
0: 0 Series

Operating temperature
): Standard product
S, I: Wide temperature

NAND flash process
E: 2x nm SLC
H: 1x nm MLC

NAND flash types
S: SLC
Q: QMLC
M: MLC

Hagiwara control information

DIMM DDR3

F N 12 N – 04G N (S F 8 14 L3

Onboard DRAM
F: DDR3

Module type
D: U-DIMM
N: SO-DIMM

Module speed
10: PC3-10600 (1333 MHz)
12: PC3L-12800 (1600 MHz)

Operating temperature
N: Normal range Standard temperature product
I: Extended range Wide temperature product

Hagiwara control information

DRAM speed
14: DDR3-1866

DRAM configuration
8: x8
6: x16

DRAM capacity
2: 256 MB
E: 2 GB
F: 4 GB

DRAM vendor

ECC
E: ECC
N: non ECC

Module capacity
ex. 512: 512 MB
ex. 08G: 8 G

DIMM DDR4

G N 19 N 016G N – S 6 8 19 L1

Onboard DRAM
G: DDR4

Module type
D: U-DIMM
N: SO-DIMM

Module speed
17: PC4-17000 (2133 MHz)
19: PC4-19200 (2400 MHz)

Operating temperature
N: Normal range Standard temperature product
I: Extended range Wide temperature product

Hagiwara control information

DRAM speed
19: DDR4-2400

DRAM configuration
8: x8
6: x16

DRAM capacity
5: 4 GB
6: 8 GB

DRAM vendor

ECC
E: ECC
N: non ECC

Module capacity
ex. 016G: 16 G

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Contact one of our branches
Monday to Friday (excepting public holidays, summer vacation, the end of year and New Year period, and special closing days)
Available: 10:00 a.m. to 12:00 p.m., 1:00 p.m. to 5:00 p.m.

Look at our website for the latest information on our services. http://www.hagisol.com

HSP18041-A03
February 2019