Biwin
Storage Technology

Industrial and Automotive
Storage Solutions



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BIWIN Storage Technology Co., Ltd. (SSE STAR Market 688525) produces high quality flash storage and is now known in embedded, consumer, corporate and industrial segments for its independent development capabilities in hardware, software, firmware, and storage algorithms.

BIWIN's experience in production (along with its complete packaging, testing, and production lines) ensures BIWIN products are superior in performance, earning BIWIN many awards and a reputation for providing global customers with high-quality storage products.

BIWIN recently opened its latest 110,000 m^2 facility, Greater Bay Advanced Technology Co., Ltd., with state-of-the-art R&D and production.

Our founders started in the flash storage business in Shenzhen, China in 1995, embracing the "WIN-WIN" business philosophy that would later become the hallmark for BIWIN. In 2009 they made a key decision for the business: to add IC encapsulation (or IC packaging) process into the factory. A remarkable milestone that the vast of majority of competing companies still don't have (they outsource the process or buy the packaged IC). This successful step led to the 2010 creation of the company we know today, BIWIN Storage Technology Company Limited.

BIWIN Advantages

Storage Algorithms & Firmware Development

Two expert R&D teams at BIWIN work on the latest firmware development. Each core team member has at least ten-year's experience in firmware development and a rich experience in the mass production of self-developed firmware.

Full-range Product Testing Capability

BIWIN continually develops memory chip testing algorithms and automation equipment. We lead the industries with our impressive test coverage and automation. Every product from us undergoes DVT and PVT.

Outstanding Customization, Fast Response

BIWIN's track record demonstrates our extraordinary customized R&D capabilities and our fast response to our customer's needs. With our experience, we can readily meet the embedded requirements for projects including wearables, smart devices, 5G, IoT, smart industry, smart city, and vehicle networks.

Advanced Packaging & Testing

With the leading multi-chip and SiP packaging technology, BIWIN can process wafers as thin as 25 μm, support the mass production of 16-layer die stacking, and achieve the smallest packages in the industry.



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INFINITE STORAGE
UNLIMITED SOLUTIONS

Market Requirements for Industrial Storage

Features

Reliability:
24x7 uninterrupted operation

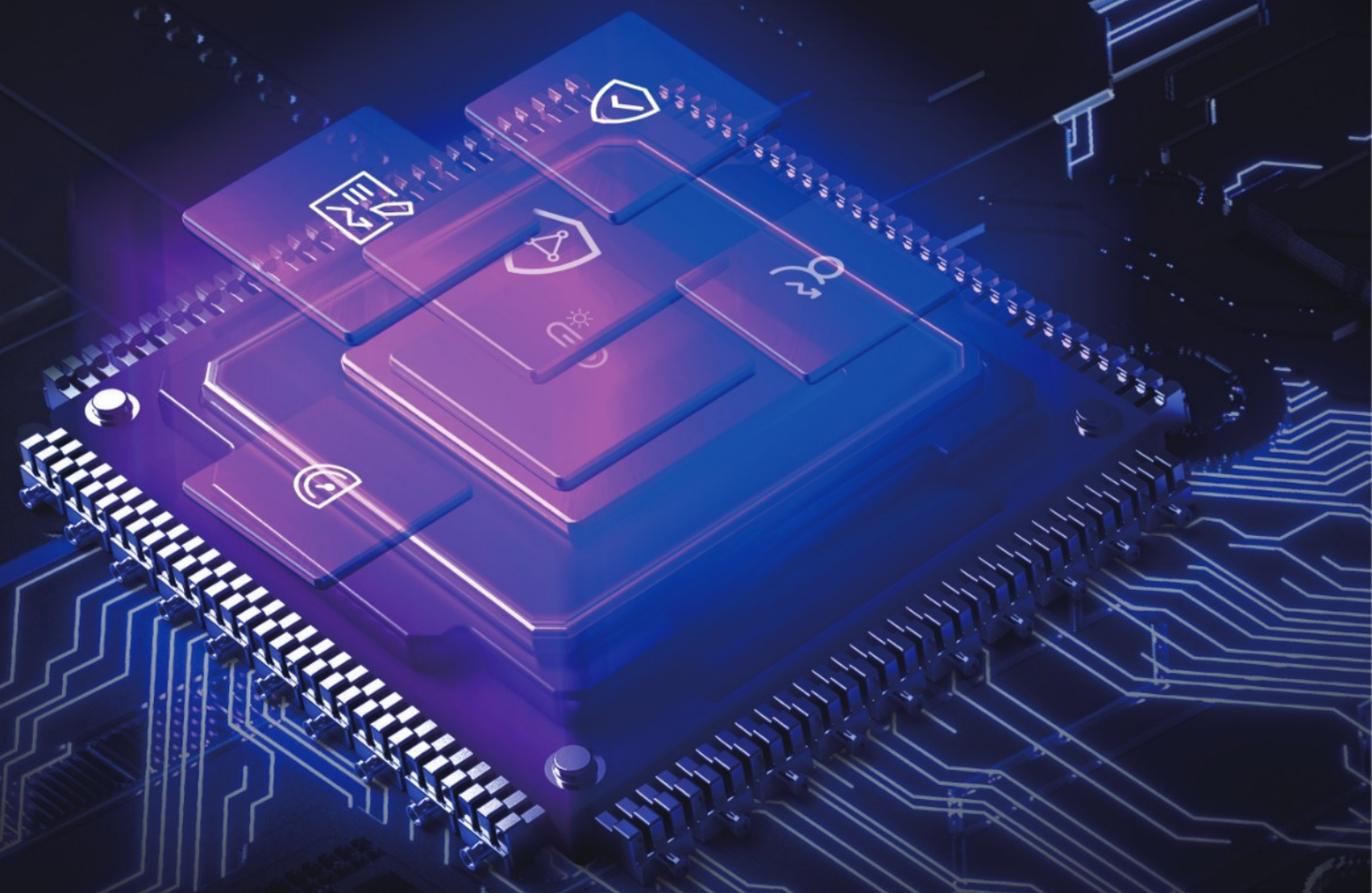
Environment:
Wide temperature

High TBW:
Large daily data write volume

Durability:
Over 10 years of operation

Monitoring:
Query for Health Info on drive

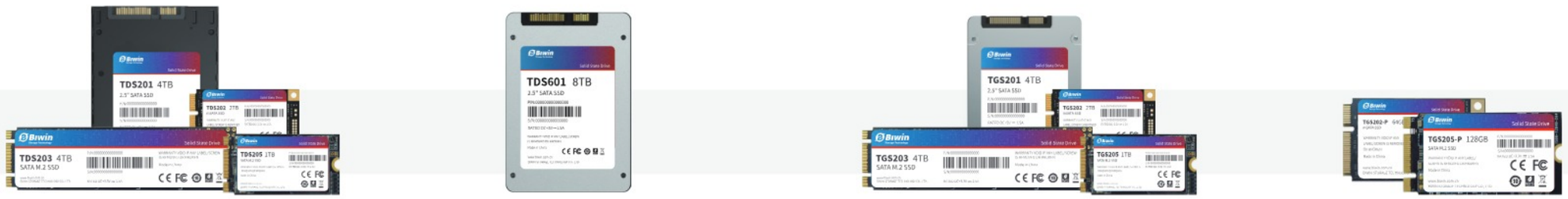
Fixed BOM :
Long-term supply & FA Support



BIWIN STORAGE TECHNOLOGY

Industrial SATA SSD





Model Name	TDS200 Series	TDS601	TGS200 Series	TGS200-P Series
Form Factor	2.5" / mSATA / M.2 2280 / M.2 2242	2.5"	2.5" / mSATA / M.2 2280 / M.2 2242	mSATA / M.2 2242
Interface	SATA III	SATA III	SATA III	SATA III
Capacity	128 GB - 4 TB	4 TB / 8 TB	128 GB - 4 TB	8 GB - 64 GB
NAND	3D TLC	3D TLC	3D TLC	Industrial 3D TLC
DRAM	No	4 GB	No	No
Firmware	SLC Cache + TLC Direct Write	TLC Direct Write	SLC Cache + TLC Direct Write	pSLC
Operation Temperature	-20 to +75 °C	-20 to +75 °C	-40 to +85 °C	-40 to +85 °C
Storage Temperature	-40 to +85 °C	-40 to +85 °C	-55 to +95 °C	-55 to +95 °C
MTBF	>2,000,000 Hours	>2,500,000 Hours	>2,000,000 Hours	>3,000,000 Hours
Seq. Read/Write (up to)	560 / 460 MB/s	560 / 520 MB/s	560 / 460 MB/s	560 / 510 MB/s
Random. Read/Write (up to)	89K / 57K IOPS	90K / 70K IOPS	89K / 57K IOPS	90K / 70K IOPS
Endurance (P/E)	3K	3K	3K	65K
TBW	4800	16000	4800	1500
Power Loss Protection	H/W Based + F/W Based	H/W Based + F/W Based	H/W Based + F/W Based	F/W Based
Limited Warranty	3 Years	3 Years	3 Years	3 Years

BIWIN STORAGE TECHNOLOGY

Industrial PCIe SSD







Specifications

Model Name	TDP200 Series	TGP200 Series
F/F	M.2 2280 / M.2 2242	M.2 2280 / M.2 2242
Interface	PCIe Gen3x4	PCIe Gen3x4
Capacity	128 GB - 2 TB	128 GB - 2 TB
NAND	3D TLC	Industrial 3D TLC
DRAM	No	No
Firmware	TLC Direct Write	TLC Direct Write
Operation Temperature	-20 to +70 °C	-40 to +85 °C
Storage Temperature	-40 to +85 °C	-55 to +95 °C
MTBF	>2,000,000 Hours	>3,000,000 Hours
Seq. Read/Write (up to)	3200 / 2700 MB/s	3400 / 2700 MB/s
Random. Read/Write (up to)	275K / 225K IOPS	330K / 220K IOPS
Endurance (P/E)	3K	3K
TBW	2000	2000
Power Loss Protection	F/W Based	H/W Based + F/W Based
Limited Warranty	3 Years	3 Years

BIWIN STORAGE TECHNOLOGY





Specifications

Model Name	TDQ200 Series	TGQ200 Series
F/F	M.2 2280 / M.2 2242	M.2 2280 / M.2 2242
Interface	PCIe Gen4x4	PCIe Gen4x4
Capacity	512 GB - 4 TB	128 GB - 4 TB
NAND	3D TLC	3D TLC
DRAM	No	No
Firmware	SLC Cache + TLC Direct Write	SLC Cache + TLC Direct Write
Operation Temperature	-20 to +75 °C	-40 to +85 °C
Storage Temperature	-40 to +85 °C	-40 to +95 °C
MTBF	>2,000,000 Hours	>2,000,000 Hours
Seq. Read/Write (up to)	7100 / 6600 MB/s	7100 / 6600 MB/s
Random. Read/Write (up to)	1050K / 1050K IOPS	1050K / 1050K IOPS
Endurance (P/E)	3K	3K
TBW	3000	4800
Power Loss Protection	H/W Based + F/W Based	H/W Based + F/W Based
Limited Warranty	3 Years	3 Years

Industrial Embedded Storage

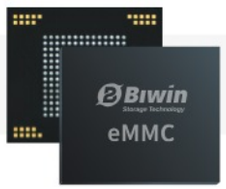
Features

- Industrial selection with high reliability
- 24/7 stable operation for long periods
- Industrial wide temperature range from -40 to +85 °C
- Quality assurance for industrial standards
- </> Supports customization in both software and hardware
- Long-term and stable supply guarantee

BIWIN STORAGE TECHNOLOGY

Industrial eMMC

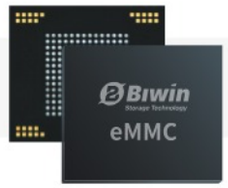




Specifications

Model Name	TDE208 / TDE218	TDE308
Interface	eMMC 5.1	eMMC5.1 HS400
Capacity	8 GB - 128 GB	64 GB - 128 GB
Flash Type	MLC / 3D TLC	3D TLC
Firmware	SLC Cache	SLC Cache
Seq. Read/Write (up to)	325 / 200 MB/s	325 / 255 MB/s
Operation Temperature	-25 to +85 °C	-25 to +85 °C
Storage Temperature	-40 to +85 °C	-40 to +85 °C
Endurance (P/E)	3K+	3K
Power Loss Protection	F/W based	F/W based
Packaging	BGA 153 Ball	FBGA 153 Ball
Dimensions	11.50 x 13.00 x 1.10 mm	11.50 x 13.00 x 1.10 mm
Health Info. / Field Firmware Update (FFU)	Yes / Yes	Yes / Yes
AEC-Q100 Certification	No	No
Limited Warranty	3 Years	3 Years

BIWIN STORAGE TECHNOLOGY

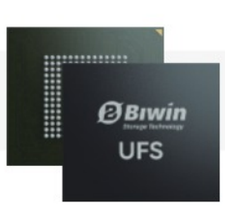


Specifications

Model Name	TGE208/TGE218/TGE318/TGE408	TAE308/TAE318
Interface	eMMC 5.1	eMMC 5.1
Capacity	8 GB - 128 GB	8 GB - 128 GB
Flash Type	MLC / 3D TLC	3D TLC
Firmware	TLC Direct Write / pSLC / SLC Cache	SLC Cache
Seq. Read/Write (up to)	330 / 220 MB/s	330 / 290 MB/s
Operation Temperature	-40 to +85 °C	-40 to +105 °C / -40 to +95 °C
Storage Temperature	-40 to +85 °C	-40 to +105 °C / -40 to +95 °C
Endurance (P/E)	3K+ / 30K+（pSLC mode）	3K
Power Loss Protection	F/W based	F/W based
Packaging	BGA 153 Ball	FBGA 153 Ball
Dimensions	11.50 x 13.00 x 1.10 mm	11.50 x 13.00 x 1.10 mm
Health Info. / Field Firmware Update (FFU)	Yes / Yes	Yes / Yes
AEC-Q100 Certification	No	AEC-Q100 Grade2 / AEC-Q100 Grade3
Limited Warranty	3 Years	3 Years

UFS





Specifications

Model Name	TAU208
Interface	UFS 3.1 HS G4 x 2Lane
Capacity	128 GB - 512 GB
Flash type	3D TLC
Operation Temperature	-40 to +105 °C
Storage Temperature	-40 to +105 °C
Seq. Read/Write (up to)	2150 / 1650 MB/s
Random. Read/Write (up to)	300K IOPS
Interface Bandwidth	23.2 Gbps
MTBF	30,000,000 Hours
Dimensions	11.50 x 13.00 x 1.20 mm
Packaging	BGA 153 Ball
AEC-Q100 Certification	AEC-Q100 Grade2

NOR Flash



Specifications

Model Name	TGN298 Series
Capacity	32 Mb - 128 Mb
Operation Temperature	-40 to +85 °C
Storage Temperature	-65 to +150 °C
Voltage	2.7 V - 3.6 V
Frequency	120 MHz
Packaging	SOP8 / TSSOP8 / WSON8 / KGD
Dimensions	
Endurance (P/E)	100 K

Industrial LPDDR





Specifications

Model Name	TGL268 Series
Capacity	2 GB - 8 GB
Operation Temperature	-40 to +95 °C
Storage Temperature	-40 to +95 °C
Voltage	V_{DD1} = 1.80 V V_{DD2} = 1.10 V V_{DDQ} = 0.60 V or 1.10 V
Data Rate (Up to)	4266 Mbps (LPDDR4x)
Packaging	BGA 200 ball
Dimensions (Max)	10.00 x 14.50 x 0.90 mm
Limited Warranty	3 Years



Specifications

Model Name	TGL378 Series
Capacity	2 GB - 16 GB
Operation Temperature	-40 to +95 °C
Storage Temperature	-40 to +95°C
Voltage	V_{DD1} = 1.80 V V_{DD2} = 1.05 V V_{DDQ} = 0.50 V or 0.30 V
Data Rate (Up to)	7500 Mbps (LPDDR5x)
Packaging	BGA 315 ball
Dimensions (Max)	12.40 x 15.00 x 1.25 mm
Limited Warranty	3 Years

Industrial DRAM

Features

- Advanced ECC Support: Reduces data error risks, ensuring system stability
- Wide Temperature Range: Operation reliability from -40 to +85 °C for harsh environments
- High Data Rate: Speeds up to 3200 Mbps, optimizing data transfer speed
- Sulfur-Resistant Components: Rigorous ANSI/ISA-71.04 -2013 tests for industrial resilience passed
- Low Power Consumption: 1.2V voltage design for energy-efficient performance

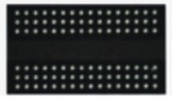
BIWIN STORAGE TECHNOLOGY

Industrial Wide-Temperature DRAM Module









Specifications

Model Name	DDR4 ECC UDIMM Wide-Temperature	DDR4 ECC SODIMM Wide-Temperature
Capacity	8 GB / 16 GB	8 GB / 16 GB
ECC	ECC Support	ECC Support
Die	KGD, Original	KGD, Original
Pin Qty	288 Pin	260 Pin
Data Rate (Up to)	3200 Mbps	3200 Mbps
Voltage	1.2 V	1.2 V
Operation Temperature	-40 to +85 °C -40 to +95 °C (Optional)	-40 to +85 °C -40 to +95 °C (Optional)
Storage Temperature	-55 to +100 °C	-55 to +100 °C
PCB Dimenions	133.35 x 31.25 x 3.90 mm	69.60 x 30.00 x 3.70 mm
Pin Thickness	30 µ"	30 µ"
Anti-Sulfur	Yes	Yes
Limited Warranty	3 Years	3 Years

BIWIN STORAGE TECHNOLOGY

Specifications

Model Name	PZ005
Interface	DDR4
Capacity	4 Gb(256M*16bit) / 8 Gb(512M*16bit)
Die	KGD, Original
Ball Qty	96 Ball
Frequency	3200 Mbps
Voltage	1.2 V
Operation Temperature	-40 to +95 °C
Storage Temperature	-55 to +100 °C
PCB Dimensions	14.00 x 9.00 x 1.12 mm
Ball Pitch	0.8 mm
Limited Warranty	3 Years

Industrial DRAM Module





Specifications

Model Name	DDR4 UDIMM	DDR4 SODIMM
Capacity	8 GB / 16 GB	8 GB / 16 GB
ECC	Non-ECC	Non-ECC
Die	KGD, Original	KGD, Original
Pin Qty	288 Pin	260 Pin
Frequency	3200 Mbps	3200 Mbps
Voltage	1.2 V	1.2 V
Operation Temperature	0 to +85 °C / -25 to +85 °C 0 to +95 °C / -25 to +95 °C(Optional)	0 to +85 °C / -25 to +85 °C 0 to +95 °C / -25 to +95 °C(Optional)
Storage Temperature	-55 to +100 °C	-55 to +100 °C
PCB Dimenions	133.35 x 31.25 x 3.90 mm	69.60 x 30.00 x 3.70 mm
Pin Thickness	30μ"	30 μ"
Anti-Sulfur	No	No
Limited Warranty	3 Years	3 Years

BIWIN STORAGE TECHNOLOGY





Specifications

Model Name	DDR5 RDIMM	DDR4 RDIMM
Capacity	32 GB - 96 GB	32 GB
ECC	ECC Support	ECC Support
Pin Qty	288 pin	288 pin
Frequency	5600 Mbps	3200 Mbps
Voltage	1.1 V	1.2 V
Operation Temperature	0 to +85 °C (0 to +95 °C) 0 to +95 °C / -25 to +95 °C(Optional)	0 to +95 °C
Storage Temperature	-55 to +100 °C	-55 to +100 °C
PCB Dimenions	133.35 x 31.25 x 3.9 mm	133.35 x 31.25 x 3.9 mm
Pin Thickness	30 μ"	30 μ"
Anti-Sulfur	No	No
Limited Warranty	3 Years	3 Years

Industrial SD / microSD Card

Features

- Industrial selection with high reliability
- LDPC ECC
- Transfer speed of up to 160 MB/s
- 24/7 long-term stable operation
- Dust/Waterproof, shockproof, X-Ray proof, Magnetic proof, Drop proof, Insertion Proof, and temperature resistant
- Long-term and stable supply guarantee
- Seamless multi-channel video recording without frame drops



BIWIN STORAGE TECHNOLOGY

Industrial SD / microSD Card





Specifications

Model Name	TDC207/209
Capacity	64 GB - 1 TB
NAND	3D TLC
BUS	UHS-I
Firmware	TLC Direct Write
Operation Temperature	-25 to +85 °C
Storage Temperature	-40 to +85 °C
MTBF	>3,000,000 Hours
Seq. Read/Write (up to)	160 / 120 MB/s
Random. Read/Write (up to)	9 / 3.5 MB/s
Endurance (P/E)	3K
TBW	1500
Power Loss Protection	F/W Based
Limited Warranty	3 Years



Specifications

Model Name	TGC207/209
Capacity	64 GB - 1 TB
NAND	3D TLC
BUS	UHS-I
Firmware	TLC Direct Write
Operation Temperature	-40 to +85 °C
Storage Temperature	-40 to +85 °C
MTBF	>3,000,000 Hours
Seq. Read/Write (up to)	160 / 123 MB/s
Random. Read/Write (up to)	8.9 / 3.4 MB/s
Endurance (P/E)	3K
TBW	1500
Power Loss Protection	F/W Based
Limited Warranty	3 Years

Financial & Retail Devices

In the financial and retail sectors, storage devices are essential for supporting interactive equipment. These devices store transaction data, product information, and customer records, enabling stable system operation and uninterrupted customer service. They demand high standards for performance, security, stability, and compatibility.

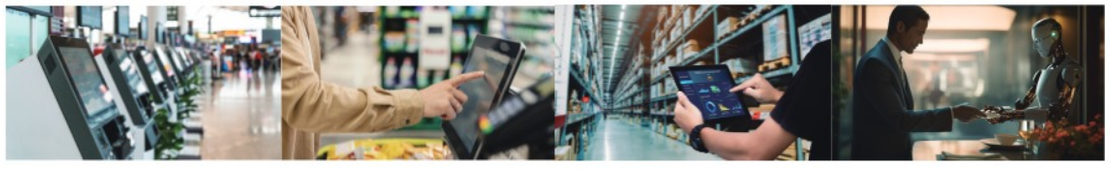
Storage Requirements:

- High Capacity, High Performance: Ensures fast data read and write speeds, supporting real-time analysis and processing for quick response capabilities.
- 24/7 Continuous Operation: Stable performance during continuous operation, supporting around-the-clock functionality.
- Fault Recovery: Rapid data recovery in case of failure, minimizing downtime.
- Energy Efficiency and Cost: Balances performance and cost, selecting cost-effective storage solutions.
- Multi-Scenario Adaptability: Adapt to various retail environments, such as store front-end, back-end data centers, and edge computing nodes.

Storage Solutions:



Specifications	Standard SATA SSD (-20 to +70 °C): 128 GB - 4 TB
	Standard PCIe SSD (-20 to +70 °C): 128 GB - 2 TB
	Standard eMMC (-25 to +85 °C): 8 GB - 128 GB
Features	Selection and design of high-reliability components, TLC direct write technology, data recovery, SRAM ECC, E2E, RAID, firmware power-loss protection, epoxy encapsulation



POS Terminal Management | Self-Checkout System | Smart Shelf Retail Management | Customer Interaction Analysis

Networking & Communications

In networking and communications, storage devices play a vital role in storing extensive network data and user information, supporting high-speed data transmission and efficient processing. These solutions are integral to cloud data centers, edge computing, and other network environments.

Storage Requirements:

- High-speed Data Transfer: Provides low-latency data access, boosting network device and application response time.
- 24/7 Continuous Operation: Ensures high reliability and stability, reducing data loss and downtime risks.
- Fault Detection and Recovery: Advanced error detection and correction (ECC) and automatic recovery protect data integrity.
- Redundancy and Fault Tolerance: RAID support enhances data redundancy and system reliability.
- Intelligent Monitoring: Includes a smart monitoring system to track device health and performance, preventing potential issues.

Storage Solutions:



Capacity	Industrial SATA SSD (-40 to +85 °C): 128 GB - 4 TB
	Industrial PCIe SSD (-40 to +85 °C): 8 GB - 4 TB
Features	Selection and design of wide-temperature components, pSLC technology (extended lifespan and high TBW), anti-sulfuration design, SRAM ECC, E2E, RAID, epoxy encapsulation.



Network Security | Cloud Storage | Router | Switch | IOT | Edge Computing

Industrial Automation

In industrial automation, storage devices are critical for capturing, processing, and analyzing data generated on production, supporting efficient manufacturing processes.

Storage Requirements:

- High Durability and Longevity: Handles high-frequency writes, and extends device lifespan to meet the demands of industrial automation.
- 24/7 Continuous Operation: Designed for stable, round-the-clock performance in continuous industrial use.
- Fault Recovery and Data Protection: Advanced ECC with power protection and recovery prevents data loss and damage.
- Wide Temperature Design: Operates from -40°C to +85°C, suited for extreme conditions.
- Shock and Vibration Resistance: Maintains stability in high-impact, vibration-prone environments.

Storage Solutions:





Capacity	Industrial SATA SSD (-40 to +85 °C): 128 GB - 4 TB
	Industrial PCIe SSD (-40 to +85 °C): 128 GB - 4 TB
Features	Selection and design of wide-temperature components, pSLC technology (extended lifespan and high TBW), anti-sulfuration design (optional), SRAM ECC, E2E, RAID, epoxy encapsulation, water/dust/drop resistance (optional)


Real-Time Data Acquisition and Monitoring


Data Archiving and Analysis


Fault Prediction and Maintenance


Production Quality Control

Security & Surveillance

In security and surveillance systems, storage devices are crucial in capturing and preserving data from cameras, sensors, and other monitoring equipment. BIWIN's specialized SSDs and storage cards are optimized for continuous 24/7 recording, ensuring stable long-term data writing without frame drops. This reliability is essential for maintaining data security, conducting investigations, and providing evidence.

Storage Requirements:

- High-Capacity Storage: Supports large volumes of data storage, meeting the demands of HD cameras and surveillance systems.
- Long-Term Retention: Capable of storing extensive video records for subsequent investigation and analysis.
- Fast Write Speed: Ensures uninterrupted video stream recording with no frame loss.
- High Read Speed: Enables quick access and playback, and supports simultaneous multi-stream processing.
- 24/7 Continuous Operation: Designed for round-the-clock functionality, ensuring stability and preventing data loss.

Storage Solutions:





Capacity	SATA SSD (-20 to +70 °C): 256 GB - 8 TB
	SD Card (-40 to +85 °C): 64 GB - 1 TB
	microSD Card (-40 to +85 °C): 64 GB - 1 TB
Features	Video monitoring algorithms, PLP (Power Loss Protection) technology, SRAM ECC/E2E/RAID, epoxy encapsulation, water/dust/drop resistance, wide-temperature operation, stable write performance, high capacity.


Intelligent Traffic Monitoring


Corporate Security Monitoring


Community Safety Monitoring


Public Security Monitoring

Smart Energy

In intelligent energy systems, storage devices are essential for their reliability, sustainability, efficiency, security, and cost-effectiveness. These capabilities support the development and innovation of energy systems.

Storage Requirements:

- High Capacity and Performance: Supports large data volumes from sensors, real-time monitoring, and historical records in energy systems.
- 24/7 Continuous Operation: Ensures round-the-clock stability and data integrity, preventing system downtime.
- Fault Detection and Recovery: Advanced error correction (ECC) and fault recovery safeguard data security.
- Environmental Resistance: Wide temperature operation, suitable for extreme conditions in energy systems.
- Shock and Vibration Resistance: Outstanding shock and vibration resilience, securing data in harsh environments.

Storage Solutions:







Capacity	Industrial SATA SSD (-40 to +85 °C): 128 GB - 4 TB
	Industrial PCIe SSD (-40 to +85 °C): 128 GB - 2 TB
	Industrial eMMC (-40 to +85 °C): 8 GB - 16 GB
Performance	High-performance flash memory and controller, MTBF > 3 million hours; DPPM < 100
Features	ECC, Discard, Boot partitions, Secure Erase, and Trim; wide temperature operation (-40°C to 85°C); compact eMMC design (11.5 x 13.0 x 1.1 mm)



Zero-Carbon Smart Parks



Commercial Complexes



Rural Microgrids



Data Centers

BIWIN STORAGE TECHNOLOGY