INDUSTRIAL
Storage & Memory Solution

2.5"SATA
Industrial SSD
2 TB
Titan Series

mSATA
T380 Family
2 TB

CFast
Industrial Memory Card
128 GB
Momentum Series

CERVOZ
Making Memories for Industry

About Cervoz

Cervoz develops, produces and markets industrial storage and memory products for the professional, critical, and diverse industrial applications.

Established in 2006, Cervoz specializes in embedded components for the demanding Industrial PC market and has built up our industry experience for over a decade. We deeply understand this industry, and thus are able to offer our high quality embedded products with legacy and mainstream technology, long-term availability, BOM (bill of material) control, high reliability and top compatibility.

Making Memories for Industry

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CORE **COMPETENCES**

We stand together with our customer through listening to the demand and feedback, using our experience and expertise to collaborate producing high reliability and compatibility product for industrial applications.
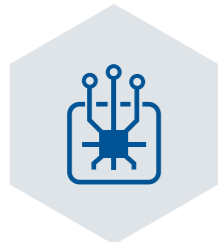
Industrial Grade Design

Only first-grade materials are used for all product lines. Our R&D expertise results in outstanding hardware and firmware designs creating products with the highest reliability, compatibility and endurance.

Product Management

We follow a unified fixed BOM principle, as well as long-term product availability in order to fulfill customers' long-term projects. Cervoz' product lifecycles are 3 to 5 years, with 8 years being the longest. We have a comprehensive ERP inventory management system with high safety stock levels ready to deliver when you need us.

Manufacturing

In the manufacturing process, we utilize the latest automation technologies. Every workflow is in line with ISO international standards to create a high-yield and the highest quality products.

Quality Assurance

For our quality assurance procedures, we test at all levels, including EVT (Engineering Verification Test), DVT (Design Verification Test) and PVT (Production Verification Test), as well as application and compliance tests. It brings Cervoz' product with high reliability and top compatibility. Cervoz products are certified with CE, FCC, REACH and RoHS.

Premium Service

We care about every detail and exceed customers' expectations. We use our industry know-how and experience to offer premium sales and services and provide real-time technical support. Our services cover specialized testing and reporting on demand, debugging analysis, customization service and many more.
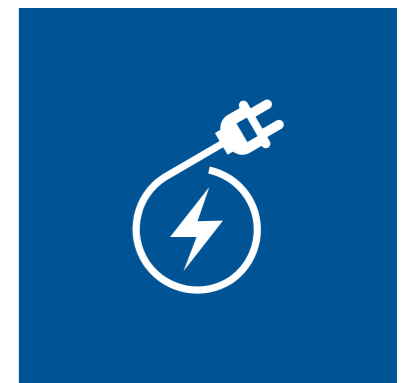
TECHNOLOGIES

Cervoz continues to bring the most innovative products and offer unique features and value-added solutions to a wide range of industries.

Powerguard (PLP)

Powerguard SSD is designed for mission-critical application when the system encounters unpredictable power failure.

Powerguard is a Power Loss Protection (PLP) technology developed by Cervoz. It provides additional power during an unexpected power outage to complete current flash write operation, moreover, to protect firmware, mapping table integrity.

RO-MLC

Reliability-Optimized MLC

Cervoz Reliance Series utilizes our " Reliability Optimized MLC (RO-MLC) Technology ". We adopt specialized firmware to simulate the mechanism acting like SLC. It is a cost-effective solution for high-reliability applications.

TECHNOLOGIES

Multi-Layered Data Protection

A specialized design product with multi-layered data protection against information leakage which is consist of AES 256-bit, write protection, quick erase and physical destruction.
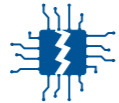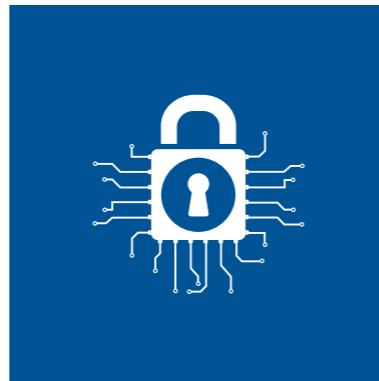
AES Security   Write Protection   Quick Erase   Physical Destruction

Cervoz FlashMonitor

Cervoz FlashMonitor is specialized flash disk monitoring software, developed in-house, dedicated to monitoring flash storage health.

Disk relevant information and health conditions can be checked and monitored in real time, preventing functional degradation and predicting disk lifespan.

TECHNOLOGIES

Wide Temperature

Cervoz wide temperature storage and memory modules support operating temperatures from - 40°C ~ +85°C. Product compatibility and stability through strict environmental testing, which makes the products exceptionally durable for harsh environments.

Furthermore, the thermal sensor designed allows the host hardware or software to monitor the storage device temperature.

Conformal Coating

Conformal coating is a thin protective film applied to products as protection against moisture, dust, chemicals, thermal shocks and sunlight. If storage and memory modules must withstand harsh environments, the conformal coating becomes necessary in order to prevent damage or failure of the electronics and at the same time increases the lifecycle of the product.

Anti-Vibration Fill

The purpose of Anti-Vibration Fill is to enhance the robustness of storage and memory modules. It is done by filling epoxy resin between the edges of PCB and ICs to prevent the solder joints from coming loose to enhance resistance against the pull-out and shear force.

APPLICATIONS

Cervoz offers a variety of storage and memory product from entry-level to the supreme-level to fulfill any industrial application needs.

Embedded Computing

The various Industrial Memory Cards and Industrial Embedded Modules with comprehensive small size form factors and interfaces are ideal for embedded computing applications.

Factory Automation

Cervoz industrial storage and memory products offer the highest reliability and quality. The wide-ranging portfolio with different NAND technologies and industry-dedicated features guarantee the right solution for smart factory.

Infotainment

The market for Infotainment terminals includes a variety of platforms from Banking Automation, POS, Kiosk, Digital Signage to Advertising Display.

Cervoz storage solution offers superior reliability, enhanced security and data protection for these required applications.

RUGGED & DEFENSE

Military and Government applications are mission-critical operations, robust storage is always the first priority. Cervoz Military Grade SSD is compliant with MIL-STD-810G standards, AES 256-bit encryption algorithm to avoid confidential data exposure and Multi-Layered data protection designed against sensitive information leakage.

COMPLIANT
MIL-STD 810G
MILITARY GRADE

APPLICATION

MILITARY GRADE
MIL-STD-810G Compliant

COMPLIANT
MIL-STD
810G
MILITARY GRADE

Rugged & Defense

Military Grade SSD

Defense and Military applications are mission-critical operations, the robust storage is always the first priority.

Cervoz, as a leading manufacturer of industrial storage and DRAM modules, takes our military grade SSD as the highest level of rugged industrial grade product, with designed multi-layered data protection against information leakage; AES 256-bit encryption algorithm to avoid confidential data exposure. Cervoz Military Grade SSD is compliant with MIL-STD-810G standards, which guarantees the high level of shock and vibration resistance.

PRODUCT SPEC.

Family	M339		
Form Factor	2.5" SATA SSD	Key Features	• MIL-STD-810G Compliant
Flash Type	MLC		• Powerguard Function (PLP)
Interface	SATA III 6.0Gb/s		• AES 256-bit Encryption
	(backward compatible to		• Multi-Layered Data Security
	3.0Gb/s, 1.5Gb/s)		• Conformal Coating (Optional)
Connector	SATA (7 + 15 pin)		• Anti-Vibration Fill
Capacity	32GB~512GB		• Build-in Thermal Sensor
Sequential Read / Write	up to 550/355 MB/s		• With DDR3 DRAM Buffer
Supply Voltage	+5V DC+/-5%		• Static and Dynamic Wear Leveling
Outline Dimensions(mm)	100.0x 69.85 x7.00 mm		• Bad Block Management

Military Grade SSD
PRODUCT FEATURES

COMPLIANT
MIL-STD
810G
MILITARY GRADE

MIL-STD-810G Compliant

MIL-STD-810G Compliant
Cervoz Military Grade SSD meets the strict specifications set by United States Military Standards for all products used in military and defense applications.

Multi-Layered Data Security
Cervoz Military Grade SSD provides various secure layers to protect data confidentiality. Real time AES 256-bit encryption keeps confidential data safe. The Write Protection avoids any data written-in. Self-Physical Destruction is achieved via high voltage input and burnout of SSD NAND flash IC. The data is permanently destroyed and unrecoverable.

Multi-Layered Data Security

Powergurad (PLP)

Powergurad (Power Loss Protection)
The extra tantalum capacitors are designed to store extra power. It will protect data loss and the mapping table when the system encounters unpredictable power failure.

Extreme Environment (-40° C to +85° C)
Cervoz Military Grade SSD is made of high-reliability industrial grade components which can withstand -40°C to +85°C. The most important design is built-in thermal sensor which monitors SSD's temperature against overheating and alerts the host systems to take preventive actions.

Extreme Environment

Conformal Coating

Conformal Coating (Moisture, Dust and Chemical-Proof)
Cervoz applies a protective coating designed for military and defense applications. This conformal coating is compliant with MIL-I46058C which ensures the maximum protection in harsh environment.

Storage & Memory Solutions

INDUSTRIAL IOT

In the IoT/ IIoT and edge computing applications, it is critical to sustain work which requires long-operating interval uninterrupted for mass data collection, processing and analysis.

Cervoz storage and memory solutions are IoT/IIoT-ready. The solutions employ cutting-edge technologies and availability in various capacities, form factors, and interfaces to meet today's computing and storage demands.

Focus Market

APPLICATIONS

Medical

Health care application demand is very high standards for safety and reliability. People rely on medical instruments in the most critical conditions of their lives and there is no tolerance for malfunctioning systems.

Cervoz Reliability Optimized MLC and Powerguard product can make sure the data can be proceeded correctly in real-time to avoid lives at risk.

In-Vehicle

In automotive applications, all components are required to operate within a wide temperature range and withstand sudden power loss as well as shock and vibration resistance.

Cervoz provides high-quality SLC, cost-effective endurance MLC solutions and big capacity available TLC solution to meet In-Vehicle needs.
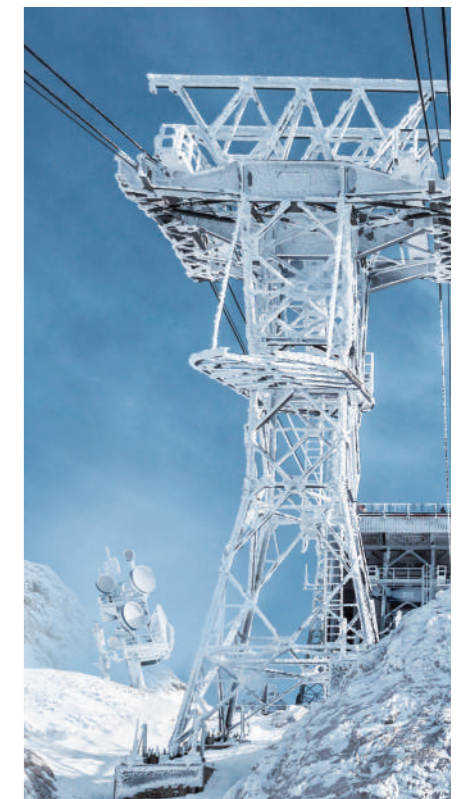
Networking / Telecom

Massive data transmission happens every second. An important component of networking and telecommunication infrastructure is the storage and memory, which determines how much accurate data can be stored and how fast it could be transmitted, processed and accessed.

Cervoz provides high performance Registered DIMM with ECC memory solution and high IOPS storage solution for multi-tasking networking applications.

FLASH STORAGE SOLUTION

2.5" SATA SSD

MEMORY CARD

EMBEDDED MODULE

FORM FACTOR COMPARISON

2.5" SSD	CFast Card CompactFlash Card	Half Slim (MO-297)	mSATA (MO-300)	M.2 2242	M.2 2280
100 / 70.0	36.4 / 42.8	39.0 / 54.0	50.85 / 29.85	42.0 / 22.0	80.0 / 22.0
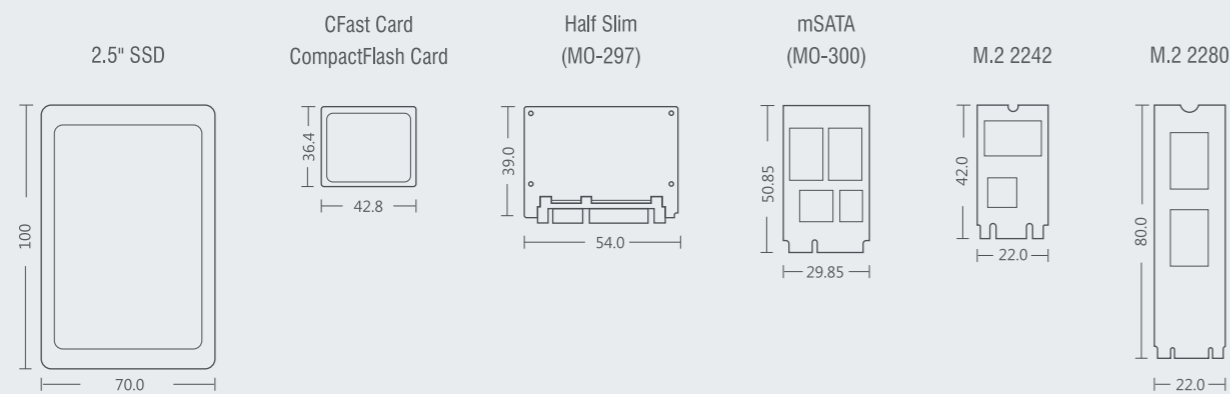
Units: mm

Flash Storage Solution

Industrial 2.5" SATA SSD

Cervoz 2.5" SSD product lines are ideal solutions for embedded applications requiring reliable and high data retention storage.

Cervoz 2.5" SSD product line includes four different technologies and supports DIPM, NCQ, TRIM, advanced wear-leveling, bad block management and security erase.

- **Supreme(SLC)** series with the highest data retention and supports long-term supply.
- **Reliance (Reliability Optimized MLC)** series is a high endurance MLC product, which simulates the SLC mechanism to improve product endurance.
- **Momentum (MLC)** series is a cost-effective solution for most industrial applications.
- **Titian (TLC)** series adopts the latest 3D NAND technology to meet high performance and big capacity industrial application needs.

2.5" SATA SSD

2.5" SATA SSD

Supreme (SLC) / Reliance (RO-MLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	S310	R335	R336
Flash Type	SLC	RO-MLC	RO-MLC
Form Factor	2.5" SATA	2.5" SATA	2.5" SATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)		
Connector	SATA (7 + 15 pin)	SATA (7 + 15 pin)	SATA (7 + 15 pin)
Capicaty	4GB~64GB	16GB~256GB	16GB~256GB
Outline Dimensions	100.10 x 69.85 x 7.00 mm	100.00 x 69.85 x 7.00 mm	100.00 x 69.85 x 7.00 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE			
Sequential Read	up to 130MB/s	up to 550MB/s	up to 550MB/s
Sequential Write	up to 110MB/s	up to 465MB/s	up to 465MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+5V DC +/-5%	+5V DC +/-5%	+5V DC +/-5%
Power Consumption	Active mode: < 1480mW	Active mode: < 2200mW	Active mode: < 2030mW
	Idle mode: < 280mW	Idle mode: < 445mW	Idle mode: < 425mW
Low Power Management	DIPM/HIPM mode	DIPM/HIPM mode	DIPM/HIPM mode
KEY FEATURE			
Powerguard (PLP)	–	–	✓
With DRAM Buffer	–	✓	✓

Product specifications are subject to change without prior notice.

2.5" SATA SSD

Momentum (MLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	M335	M336
Flash Type	MLC	MLC
Form Factor	2.5" SATA	2.5" SATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)	
Connector	SATA (7 + 15 pin)	SATA (7 + 15 pin)
Capicaty	32GB~512GB	32GB~512GB
Outline Dimensions	100.00 x 69.85 x 7.00 mm	100.00 x 69.85 x 7.00 mm
OPERATING TEMP.		
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE		
Sequential Read	up to 550MB/s	up to 550MB/s
Sequential Write	up to 435MB/s	up to 450MB/s
ROBUSTNESS		
MTBF	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA		
Supply Voltage	+5V DC +/-5%	+5V DC +/-5%
Power Consumption	Active mode: < 2625mW	Active mode: < 2505mW
	Idle mode: < 440mW	Idle mode: < 425mW
Low Power Management	DIPM / HIPM mode	DIPM / HIPM mode
KEY FEATURE		
Powerguard (PLP)	–	✓
With DRAM Buffer	✓	✓

Product specifications are subject to change without prior notice.

2.5" SATA SSD

Titan (TLC) Series

- Operating Temperature : Standard   (0°C~+70°C)

   Wide Temp. (- 40°C~+85°C)

GENERAL	T380	T385
Flash Type	TLC	TLC
Form Factor	2.5" SATA	2.5" SATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)	
Connector	SATA (7 + 15 pin)	SATA (7 + 15 pin)
Capicaty	64GB~2TB	256GB~2TB
Outline Dimensions	100.00 x 69.85 x 7.00 mm	100.00 x 69.85 x 7.00 mm
OPERATING TEMP.		
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE		
Sequential Read	up to 560MB/s	up to 560MB/s
Sequential Write	up to 505MB/s	up to 530MB/s
ROBUSTNESS		
MTBF	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA		
Supply Voltage	+5V DC +/-5%	+5V DC +/-5%
Power Consumption	Active mode: < 1450mW Idle mode: < 200mW	Active mode: < 3400mW Idle mode: < 300mW
Low Power Management	DIPM / HIPM mode	DIPM / HIPM mode
KEY FEATURE		
Powerguard (PLP)	–	–
With DRAM Buffer	–	✓

Product specifications are subject to change without prior notice.

Industrial Memory Card

Cervoz industrial memory card product line consists of both CompactFlash and CFast Cards. The wide-ranging portfolio with different NAND technologies and industry-dedicated features guarantees the right solution for each embedded usage.

Cervoz industrial memory cards in applications require small form factors, high endurance and reliability to withstand shock and vibration. It fits rugged and easy replaceable storage for embedded and industrial systems.

Memory Card

CompactFlash Card

Supreme (SLC) / Reliance (RO-MLC) / Momentum (MLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

| GENERAL	S120	R120	M120
Flash Type	SLC	RO-MLC	MLC
Form Factor	CompactFlash	CompactFlash	CompactFlash
Interface	CompactFlash Specification v6.0 (backward compatible to v3.x, 4.x, 5.x)		
Connector	PATA (50 pin)	PATA (50 pin)	PATA (50 pin)
Capicaty	128MB~32GB	2GB~32GB	4GB~64GB
Outline Dimensions	42.8 x 36.4 x 3.3 mm	42.8 x 36.4 x 3.3 mm	42.8 x 36.4 x 3.3 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE			
Sequential Read	up to 80MB/s	up to 80MB/s	up to 65MB/s
Sequential Write	up to 65MB/s	up to 70MB/s	up to 40MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	3.3V DC or 5V DC +/-5%	3.3V DC or 5V DC +/-5%	3.3V DC or 5V DC +/-5%
Power Consumption	Active mode: < 945mW Idle mode: < 5mW	Active mode: < 650mW Idle mode: < 20mW	Active mode: < 650mW Idle mode: < 20mW
KEY FEATURE			
Features	• Static and dynamic wear leveling • Bad block management • S.M.A.R.T.		
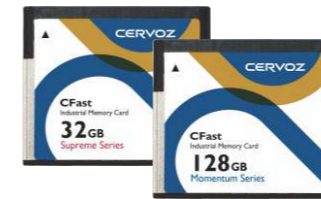
CFast Card

Supreme (SLC) / Reliance (RO-MLC) / Momentum (MLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	S310	R310	M350
Flash Type	SLC	RO-MLC	MLC
Form Factor	CFast	CFast	CFast
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)		
Connector	SATA (7+17 pin)	SATA (7 + 17 pin)	SATA (7 + 17 pin)
Capicaty	1GB~64GB	2GB~64GB	32GB~128GB
Outline Dimensions	42.8 x 36.4 x 3.3 mm	42.8 x 36.4 x 3.3 mm	42.8 x 36.4 x 3.3 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE			
Sequential Read	up to 65MB/s	up to 520MB/s	up to 495MB/s
Sequential Write	up to 55MB/s	up to 175MB/s	up to 445MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+3.3V DC+/-5%	+3.3V DC+/-5%	+3.3V DC+/-5%
Power Consumption	Active mode: < 1400mW Idle mode: < 290mW	Active mode: < 2305mW Idle mode: < 285mW	Active mode: < 1550mW Idle mode: < 300mW
KEY FEATURE			
Features	• Static and dynamic wear leveling • Bad block management • S.M.A.R.T. & TRIM command		

Flash Storage Solution

Industrial Embedded Module

Cervoz mSATA (MO-300), Half Slim (MO-297), SATA Disk, PATA Disk and the M.2 SSD target embedded applications which require storage in small, removable form factors. Cervoz Embedded modules withstand high shock and vibration and offer superior performance and endurance.

Meanwhile, Cervoz Valve-Added Service, Anti-Vibration Fill, improves resistance against the double pull-out force and Conformal Coating effectively protects against moisture and dust in harsh environments.

mSATA

Supreme (SLC) / Reliance (RO-MLC) Series

- Operating Temperature : Standard   (0°C~+70°C)

    Wide Temp. (- 40°C~+85°C)

	S310	R335	R336
GENERAL			
Flash Type	SLC	RO-MLC	RO-MLC
Form Factor	mSATA	mSATA	mSATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)		
Connector	mSATA	mSATA	mSATA
Capicaty	4GB~64GB	16GB~128GB	16GB~64GB
Outline Dimensions	50.80 x 29.85 x 4.00 mm	50.95 x 30.00 x 3.90 mm	50.95 x 30.00 x 3.90 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE			
Sequential Read	up to 130MB/s	up to 510MB/s	up to 495MB/s
Sequential Write	up to 110MB/s	up to 465MB/s	up to 440MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+3.3V DC +/-5%	+3.3V DC +/-5%	+3.3V DC+/-5%
Power Consumption	Active mode: < 1480mW Idle mode: < 280mW	Active mode: <2090mW Idle mode: < 430mW	Active mode: < 1970mW Idle mode: < 375mW
Low Power Management	DIPM/HIPM mode	DIPM/HIPM mode	DIPM/HIPM mode
KEY FEATURE			
Powerguard (PLP)	–	–	✓
With DRAM Buffer	–	✓	✓

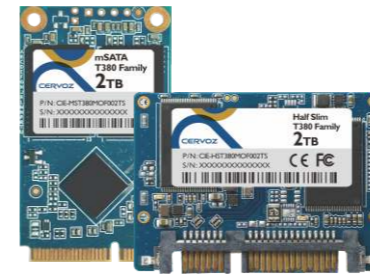*Product specifications are subject to change without prior notice.*

mSATA

Momentum (MLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	M335	M336
Flash Type	MLC	MLC
Form Factor	mSATA	mSATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)	
Connector	mSATA	mSATA
Capicaty	32GB~256GB	32GB~128GB
Outline Dimensions	50.95 x 30.00 x 3.90 mm	50.95 x 30.00 x 3.90 mm
OPERATING TEMP.		
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE		
Sequential Read	up to 545MB/s	up to 545MB/s
Sequential Write	up to 435MB/s	up to 330MB/s
ROBUSTNESS		
MTBF	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA		
Supply Voltage	+3.3V DC+/-5%	+3.3V DC+/-5%
Power Consumption	Active mode: < 2295mW	Active mode: < 1890mW
	Idle mode: < 390mW	Idle mode: < 390mW
Low Power Management	DIPM/HIPM mode	DIPM/HIPM mode
KEY FEATURE		
Powerguard (PLP)	–	✓
With DRAM Buffer	✓	✓

mSATA / Half Slim

Titan (TLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	T380	T380	T385
Flash Type	TLC	TLC	TLC
Form Factor	Half Slim	mSATA	mSATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)		
Connector	SATA (7+15pin)	mSATA	mSATA
Capicaty	64GB~2TB	64GB~2TB	256GB~1TB
Outline Dimensions	54.00 x 39.00 x 4.00 mm	50.80 x 29.85 x 4.00 mm	50.80 x 29.85 x 4.00 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	- 40°C ~ +85°C	- 40°C ~ +85°C
PERFORMANCE			
Sequential Read	up to 560MB/s	up to 560MB/s	up to 560MB/s
Sequential Write	up to 505MB/s	up to 525MB/s	up to 490MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+3.3V DC+/-5%	+5V DC +/-5%	+5V DC +/-5%
Power Consumption	Active mode: < 1450mW	Active mode: < 1475mW	Active mode: < 2510mW
	Idle mode: < 200mW	Idle mode: < 250mW	Idle mode: < 360mW
Low Power Management	DIPM/HIPM mode	DIPM / HIPM mode	DIPM / HIPM mode
KEY FEATURE			
Powerguard (PLP)	–	–	–
With DRAM Buffer	–	–	✓

Product specifications are subject to change without prior notice.

Product specifications are subject to change without prior notice.

M.2 2242

Momentum (MLC) / Titan (TLC) Series

- Operating Temperature : Standard ($0^{o}C \sim +70^{o}C$)
- Wide Temp. ($- 40^{o}C \sim +85^{o}C$)

GENERAL	M335	T380	T405 / T435 *nvm*
Flash Type	MLC	TLC	TLC
Form Factor	M.2 2242	M.2 2242	M.2 2242
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)		PCIe Gen. 3 x 4
Connector	M.2 2242 (B+M)	M.2 2242 (B+M)	M.2 2242 (M)
Capicaty	32GB~128GB	64GB~1TB	128GB~1TB
Outline Dimensions	42.00 x 22.00 x 3.65 mm	42.00 x 22.00 x 3.65 mm	42.00 x 22.00 x 3.65 mm
OPERATING TEMP.			
Standard Temperature	$0^{o}C \sim +70^{o}C$	$0^{o}C \sim +70^{o}C$	$0^{o}C \sim +70^{o}C$
Wide Temperature	$- 40^{o}C \sim +85^{o}C$	$- 40^{o}C \sim +85^{o}C$	–
PERFORMANCE			
Sequential Read	up to 545MB/s	up to 555MB/s	up to 2030MB/s / 2050MB/s
Sequential Write	up to 300MB/s	up to 520MB/s	up to 1730MB/s / 1855MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+3.3V DC +/-5%	+3.3V DC+/-5%	+3.3V DC +/-5%
Power Consumption	Active mode: < 1885mW Idle mode: < 385mW Slumber mode: < 60mW	Active mode: < 1340mW Idle mode: < 270mW	Active mode: < 3350mW / < 3600mW Idle mode: < 530mW / < 640mW
Low Power Management	DIPM / HIPM mode	DIPM / HIPM mode	ASPM mode
KEY FEATURE			
Powerguard (PLP)	–	–	– / –
With DRAM Buffer	✓	–	– / ✓

M.2 2280

Momentum (MLC) Series

- Operating Temperature : Standard ($0^{o}C \sim +70^{o}C$)
- Wide Temp. ($- 40^{o}C \sim +85^{o}C$)

GENERAL	M335	M336
Flash Type	MLC	MLC
Form Factor	M.2 2280	M.2 2280
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)	
Connector	M.2 2280 (B+M)	M.2 2280 (B+M)
Capicaty	32GB~256GB	32GB~256GB
Outline Dimensions	80.00 x 22.00 x 3.90 mm	80.00 x 22.00 x 3.90 mm
OPERATING TEMP.		
Standard Temperature	$0^{o}C \sim +70^{o}C$	$0^{o}C \sim +70^{o}C$
Wide Temperature	$- 40^{o}C \sim +85^{o}C$	$- 40^{o}C \sim +85^{o}C$
PERFORMANCE		
Sequential Read	up to 545MB/s	up to 520MB/s
Sequential Write	up to 435MB/s	up to 355MB/s
ROBUSTNESS		
MTBF	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA		
Supply Voltage	+3.3V DC+/-5%	+3.3V DC+/-5%
Power Consumption	Active mode: < 2295mW Idle mode: < 390mW Slumber mode: < 70mW	Active mode: < 2310mW Idle mode: < 380mW
Low Power Management	DIPM / HIPM mode	DIPM / HIPM mode
KEY FEATURE		
Powerguard (PLP)	–	✓
With DRAM Buffer	✓	✓

Product specifications are subject to change without prior notice.

Product specifications are subject to change without prior notice.

M.2 2280

Titan (TLC) Series

- Operating Temperature : Standard (0°C~+70°C)
  Wide Temp. (- 40°C~+85°C)

GENERAL	T380	T405 nvm	T435 nvm
Flash Type	TLC	TLC	TLC
Form Factor	M.2 2280	M.2 2280	M.2 2280
Interface	SATA III 6.0Gb/s	PCIe Gen. 3 x 4	PCIe Gen. 3 x 4
Connector	M.2 2280 (B+M)	M.2 2280 (M)	M.2 2280 (M)
Capicaty	64GB~2TB	128GB~1TB	128GB~1TB
Outline Dimensions	80.00 x 22.00 x 3.90 mm	80.00 x 22.00 x 3.90 mm	80.00 x 22.00 x 3.90 mm
OPERATING TEMP.			
Standard Temperature	0°C ~ +70°C	0°C ~ +70°C	0°C ~ +70°C
Wide Temperature	- 40°C ~ +85°C	—	—
PERFORMANCE			
Sequential Read	up to 555MB/s	up to 2105MB/s	up to 2105MB/s
Sequential Write	up to 530MB/s	up to 1685MB/s	up to 1845MB/s
ROBUSTNESS			
MTBF	> 2,000,000 hours	> 2,000,000 hours	> 2,000,000 hours
ELECTRICAL DATA			
Supply Voltage	+3.3V DC +/-5%	+3.3V DC +/-5%	+3.3V DC+/-5%
Power Consumption	Active mode: < 1480mW Idle mode: < 280mW	Active mode: < 3130mW Idle mode: < 560mW	Active mode: < 3600mW Idle mode: < 660mW
Low Power Management	DIPM / HIPM mode	ASPM mode	ASPM mode
KEY FEATURE			
Powerguard (PLP)	—	—	—
With DRAM Buffer	—	—	✓

Product specifications are subject to change without prior notice.

DRAM MODULE SOLUTION
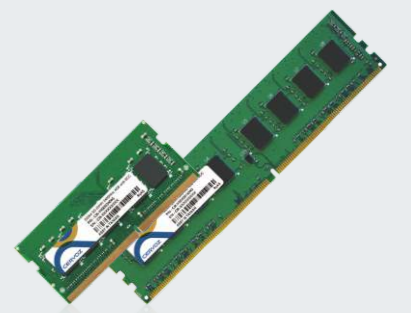
STANDARD SERIES
DDR4: DIMM/ SO-DIMM
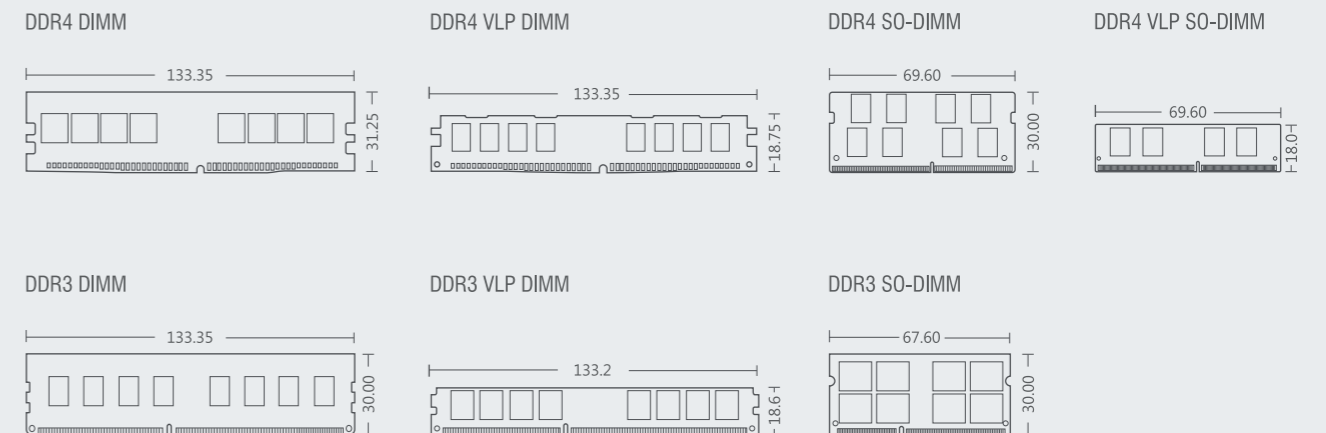 VLP DIMM/ VLP SO-DIMM
DDR3: DIMM/ SO-DIMM
 VLP DIMM

WIDE TEMP. SERIES
DDR4: DIMM/ SO-DIMM
DDR3: DIMM/ SO-DIMM

SERVER SERIES
DDR4: DIMM with ECC
 SO-DIMM with ECC
 Registered DIMM with ECC
DDR3: DIMM with ECC
 Registered DIMM with ECC

FORM FACTOR COMPARISON

DDR4 DIMM — 133.35 / 31.25

DDR4 VLP DIMM — 133.35 / 18.75

DDR4 SO-DIMM — 69.60 / 30.00

DDR4 VLP SO-DIMM — 69.60 / 18.0

DDR3 DIMM — 133.35 / 30.00

DDR3 VLP DIMM — 133.2 / 18.6

DDR3 SO-DIMM — 67.60 / 30.00

Units: mm

DRAM Module Solution

Industrial DRAM Module

Cervoz Industrial DRAM module are designed and manufactured in accordance with JEDEC standard, it includes **Standard (Unbuffered)** Series, **Wide Temperature** Series, and **Server (ECC and Registered)** Series.

Cervoz provides comprehensive DRAM generations from DDR1 to DDR4 and functionalities for the demanding requirements of the industrial computing and similar applications. The Valve-Added Service, Anti-Vibration Fill increase resistance to pull-out force and Conformal Coating effectively protects against moisture and dust in harsh environments.

DIMM/ SO-DIMM

Standard Series
- JEDEC Standard
- RoHS Compliant

Series	DDR4 Standard	DDR3 Standard
Module Type	DIMM / SO-DIMM	DIMM / SO-DIMM
Data Tate	2133MHz, 2400MHz, 2666MHz	1066MHz, 1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB, 32GB	1GB, 2GB, 4GB, 8GB
Function	Non-ECC	Non-ECC
Pin Number	288pin / 260pin	240pin / 204pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	31.25mm / 30.0mm	30.0mm
Operating Temp.	0°C ~ +85°C	0°C ~ +85°C
Anti-Vibration Fill / Conformal Coating	Optional	Optional

Product specifications are subject to change without prior notice.

VLP DIMM/ SO-DIMM

Standard Series
- JEDEC Standard
- RoHS Compliant

Series	DDR4 Standard	DDR3 Standard
Module Type	VLP DIMM / VLP SO-DIMM	VLP DIMM
Data Tate	2133MHz, 2400MHz, 2666MHz	1066MHz, 1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB (only VLP DIMM)	1GB, 2GB, 4GB, 8GB
Function	Non-ECC	Non-ECC
Pin Number	288pin / 260pin	240pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	18.75mm / 18.0mm	18.6mm
Operating Temp.	0°C ~ +85°C	0°C ~ +85°C
Anti-Vibration Fill / Conformal Coating	Optional	Optional

Product specifications are subject to change without prior notice.

DRAM Module

DIMM

Wide Temperature Series

- JEDEC Standard
- RoHS Compliant

Series	DDR4	DDR3
	Wide Temp.	Wide Temp.
Module Type	DIMM	DIMM
Data Tate	2133MHz, 2400MHz, 2666MHz	1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Function	Non-ECC	Non-ECC
Pin Number	288pin	240pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	31.25mm	30.0mm
Operating Temp.	-40°C ~ +85°C	-40°C ~ +85°C
Anti-Vibration Fill/ Conformal Coating	Optional	Optional

Product specifications are subject to change without prior notice.

SO-DIMM

Wide Temperature Series

- JEDEC Standard
- RoHS Compliant

Series	DDR4	DDR3
	Wide Temp.	Wide Temp.
Module Type	SO-DIMM	SO-DIMM
Data Tate	2133MHz, 2400MHz, 2666MHz	1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Function	Non-ECC	Non-ECC
Pin Number	260pin	204pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	30.0mm	30.0mm
Operating Temp.	-40°C ~ +85°C	-40°C ~ +85°C
Anti-Vibration Fill/ Conformal Coating	Optional	Optional

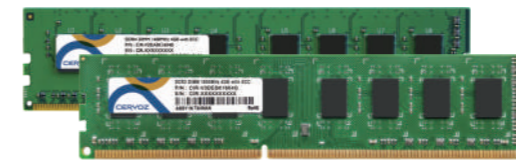*Product specifications are subject to change without prior notice.*

DIMM/ SO-DIMM with ECC

Server Series

- JEDEC Standard
- RoHS Compliant

Series	DDR4	DDR3
	Server	Server
Module Type	DIMM / SO-DIMM	DIMM
Data Tate	2400MHz, 2666MHz	1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Function	ECC	ECC
Pin Number	288pin / 260pin	240pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	31.25mm / 30.0mm	30.0mm
Operating Temp.	0°C ~ +85°C	0°C ~ +85°C
Anti-Vibration Fill/ Conformal Coating	Optional	Optional

Product specifications are subject to change without prior notice.

Registered DIMM with ECC

Server Series

- JEDEC Standard
- RoHS Compliant

Series	DDR4	DDR3
	Server	Server
Module Type	DIMM	DIMM
Data Tate	2400MHz, 2666MHz	1333MHz, 1600MHz, 1866MHz
Capacity	4GB, 8GB, 16GB, 32GB	2GB, 4GB, 8GB
Function	ECC	ECC
Pin Number	288pin	240pin
Voltage	1.2V	1.35V, 1.5V
PCB Height	31.25mm	30.0mm
Operating Temp.	0°C ~ +85°C	0°C ~ +85°C
Anti-Vibration Fill/ Conformal Coating	Optional	Optional

Product specifications are subject to change without prior notice.

MINI-PCIe EXPANSION CARD

MINI PCIe EXPANSION CARD

ACCESSORY

FORM FACTOR COMPARISON

Mini PCIe Card   Half Size   M.2 2230

50.95   26.65   30.0

30.0   29.85   22.0
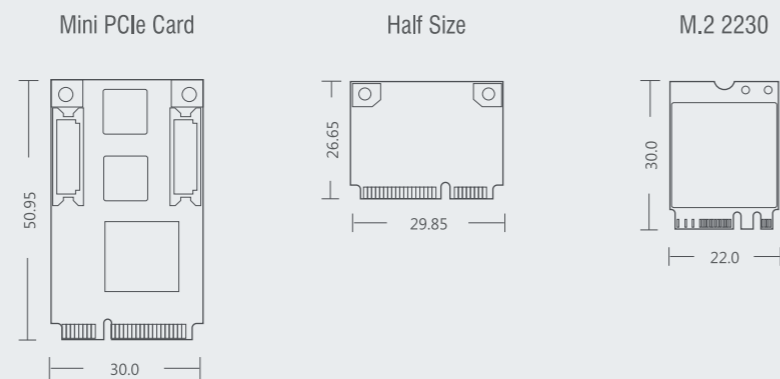
Units: mm

Mini-PCIe Expansion Card

Industrial Mini-PCIe Card

Cervoz Industrial Mini-PCIe Expansion Card product line is designed and manufactured especially for expansion purpose of Embedded PC. The combination of standard technology and small form factor makes it ideal for slim and compact PC installation. Product line Includes Ethernet, Serial, USB, Display, SATA and WiFi functionalities, it makes Embedded PC expansion possible again!

We perform strict reliability and compatibility test in order to meet the highest quality standards.

Mini-PCIe Card

Expansion Solution for Embedded PC

Cervoz Mini-PCIe expansion card allows extension of device connectivity for slim and compact PC installation in many different applications: Factory Automation, Infotainment, Medical, In-Vehicle and Networking.

Core Competence

Industrial PC Dedication

▪ Industrial Grade Components
▪ Multi-Directional Connector Fixation
  (MECFIX Daughterboard Design)
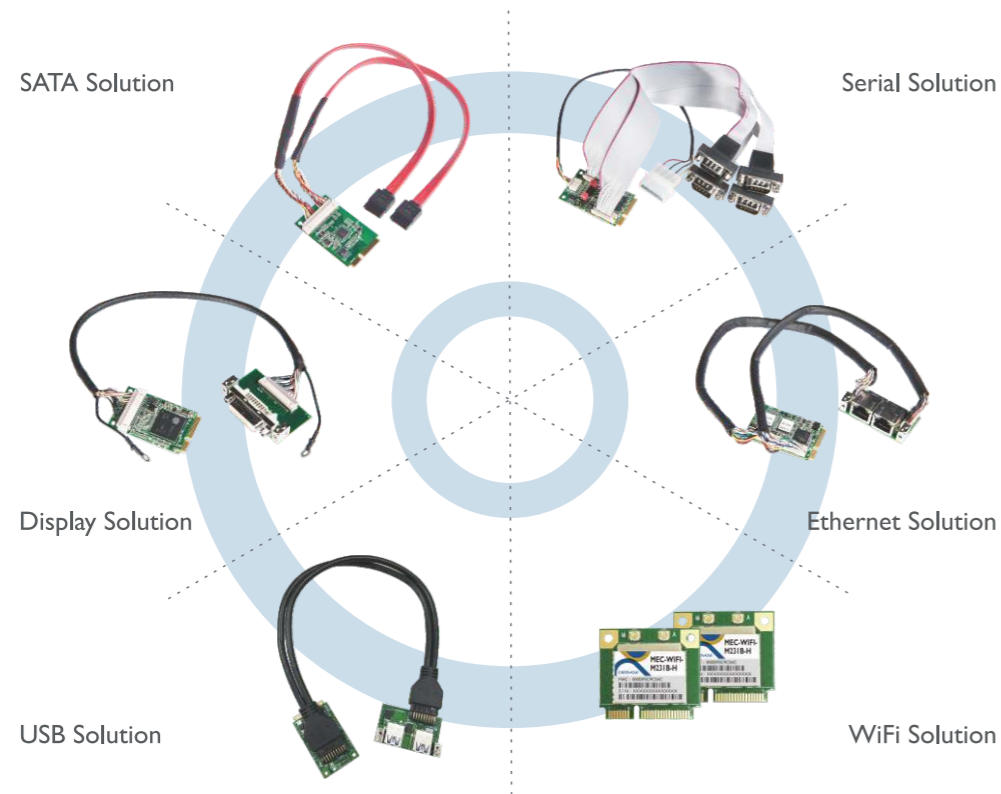▪ Long Product Lifetime
▪ Long Product Warranty

Comprehensive Product Line

▪ Various PC I/O Functions
▪ Various Choices of Expansion Ports

Full Certification

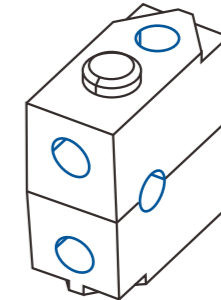▪ CE, FCC, RoHS and REACH

VARIOUS I/O Functional Solutions

SATA Solution

Serial Solution

Display Solution

Ethernet Solution

USB Solution

WiFi Solution

MECFIX-Unique Mounting Machanism

MEC USB, Ethernet and Display series come with special designed daughterboard called MECFIX. The feature of the mounting unit allows versatile mounting options which make system integrators exceptionally flexible while mounting the MEC connectors (MECFIX) on their PC or systems in every possible location.
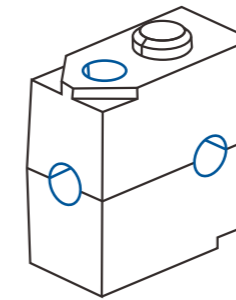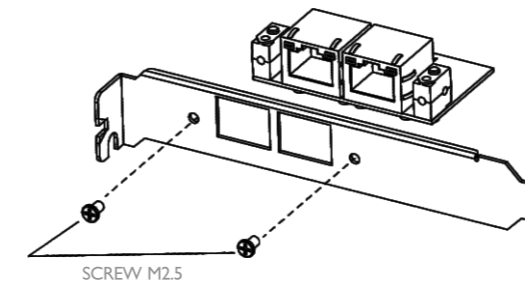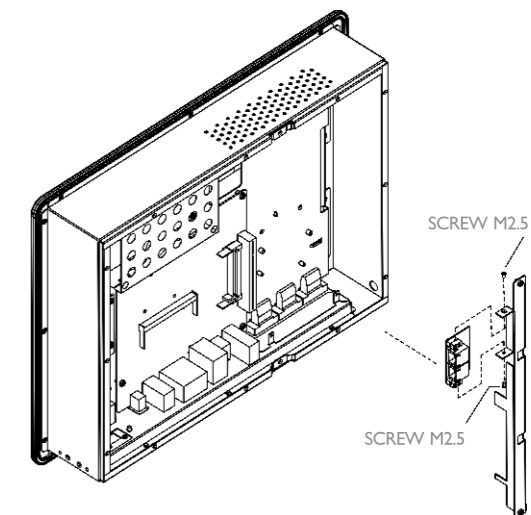

Front

Back

MECFIX Provides Following Example Mounting

Front side mounting

Upper / Right / Left side mounting
(Internal Used)

SCREW M2.5

SCREW M2.5

SCREW M2.5

Mini-PCIe Card

Serial Solution

- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

MEC-COM-M212   MEC-COM-M334

	MEC-COM-M212	MEC-COM-M334
Solution	Serial	Serial
Electromechanical Revision	Electromechanical Rev. 2.0	Electromechanical Rev. 2.0
Bus	Single-Lane (x1) PCI-Express with throughput up to 5.0/ 2.5Gbps	
Interface (Connector)	2 x RS232	4 X RS232/ RS422/ RS485
ESD Protection	15 KV on board	15 KV on board
Serial Port Power Voltage	5V or 12V	5V or 12V
Baud Rate	Asynchronous baud rates up to 921.6 Kbps	Asynchronous baud rates up to 921.6 Kbps
Power Consumption	415mA@3.3V	645mA@3.3V
Dimensions W x L	30.00 x 50.95 mm	30.00 x 50.95 mm
Operating Temp.	-40^0C~$+85^0$C	-40^0C~$+85^0$C
Driver Support	Win 2000, Win XP, Win Vista, Win 7, Win 8, Win 10	
MEC FIX	—	—

Product specifications are subject to change without prior notice.

Mini-PCIe Card

USB Solution

- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

MEC-USB-M102

	MEC-USB-M102
Solution	USB
Electromechanical Revision	Electromechanical Rev. 2.0
Bus	Single-Lane (x1) PCI-Express with throughput up to 5.0/ 2.5Gbps
Interface (Connector)	2 x USB 3.0
Performance	Data Transfer rate of 1.5 / 12 / 480 / 5000 Mbps
	• Low Speed (1.5Mbps), Full Speed(12Mbps)
	• High Speed(480Mbps), Super Speed(5Gpbs)
Power Consumption	215mA@3.3V
Dimensions W x L	30.00 x 50.95 mm
Operating Temp.	0^0C~$+85^0$C
Driver Support	Win 7, Win 8, Win 10
MECFIX	✓

Product specifications are subject to change without prior notice.

Mini-PCIe Card

Ethernet Solution

- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

MEC-LAN-M001   MEC-LAN-M002-R1

	MEC-LAN-M001	MEC-LAN-M002-R1
Solution	Ethernet	Ethernet
Electromechanical Revision	Electromechanical Rev. 1.1	Electromechanical Rev. 1.1
Bus	Single-Lane (x1) PCI-Express with throughput up to 2.5Gbps	
Controllers	Intel 82583V x 1	Intel 82583V x 2
Interface	Ethernet 10/100/1000 x 1 (RJ45)	Ethernet 10/100/1000 x 2 (RJ45)
Flow Control	IEEE 802.3 x flow control	IEEE 802.3 x flow control
Power Consumption	250mA@3.3V	835mA@3.3V
Dimensions W x L	30.00 x 50.95 mm	30.00 x 50.95 mm
Operating Temp.	-20^0C~$+70^0$C	-20^0C~$+70^0$C
Driver Support	Win XP, Win 7, Win 8	Win XP, Win 7, Win 8
MECFIX	✓	✓

Product specifications are subject to change without prior notice.

Mini-PCIe Card

Ethernet Solution

- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

MEC-LAN-M102

	MEC-LAN-M102
Solution	Ethernet
Electromechanical Revision	Electromechanical Rev. 2.0
Bus	Single-Lane (x1) PCI-Express with throughput up to 5.0/ 2.5Gbps
Controllers	Intel I210-IT x2
Interface	Ethernet 10/100/1000 x 2 (RJ45)
Flow Control	IEEE 802.3 x flow control
Power Consumption	645mA@3.3V
Dimensions W x L	30.00 x 50.95 mm
Operating Temp.	-40^0C~$+85^0$C
Driver Support	Win 7, Win 8, Win 10
MECFIX	✓

Product specifications are subject to change without prior notice.

Mini-PCIe Card

SATA Solution
- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

	MEC-SAT-M002	MEC-SAT-M102
Solution	SATA	SATA
Electromechanical Revision	Electromechanical Rev. 2.0	Electromechanical Rev. 2.0
Bus	Single-Lane (x1) PCI-Express with throughput up to 5.0 / 2.5Gbps	
Controllers	Asmedia ASM1061	Asmedia ASM1061R
Interface	SATA III x 2	SATA III x 2
Data Transfer Rate	SATA III transfer rate of 1.5Gbps, 3.0Gbps 6.0Gbps	
Power Consumption	360mA@3.3V	301mA@3.3V
Dimensions W x L	30.00 x 50.95 mm	30.00 x 50.95 mm
Operating Temp.	-20^0C~$+70^0$C	0^0C~$+85^0$C
Driver Support	Win 2003, Win XP, Win Vista, Win 7, Win 8	Win 7, Win 8, Win 10
MECFIX	–	–
Function	–	RAID

Product specifications are subject to change without prior notice.

Mini-PCIe Card

Display Solution
- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

	MEC-DIS-M002
Solution	Display
Electromechanical Revision	Electromechanical Rev. 1.1
Bus	Single-Lane (x1) PCI-Express with throughput up to 2.5Gbps
Controllers	SiliconMotion SM750 with 16MB DDR SDRAM
Interface (Connector)	DVI-I x 1 (Support DVI, VGA)
Performance	DVI Resolution : Up to 1280 x 1024, 60Hz VGA Resolution : Up to 1280 x 1024, 60Hz
Power Consumption	740mA@3.3V
Dimensions W x L (mm)	30.00 x 50.95 mm
Operating Temp.	-20^0C~$+70^0$C
Driver Support	Win 7, Win 8, Win 10
MECFIX	✓

Product specifications are subject to change without prior notice.

Mini-PCIe Card

WiFi Solution
- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

	MEC-WIFI-M101-H	MEC-WIFI-M231B-H
Solution	WiFi	WiFi
Form Factor	Half size	Half size
Frequency Range	802.11 b/g/n	802.11 a/b/g/n/ac + Bluetooth 4.0
Chipset	Realtek RTL8188EE	Realtek RTL8821AE
Interface	Mini PCI Express	Mini PCI Express
T/R	1T1R	1T1R , 2Ant
Dimensions W x L	29.85 x 26.65 mm	29.85 x 26.65 mm
Operating Temp.	0^0C~$+70^0$C	0^0C~$+70^0$C
Driver Support	Win XP, Win Vista, Win 7, Win 8, Win 10	Win 7, Win 8/8.1, Win 10, Linux, Android

Product specifications are subject to change without prior notice.

Mini-PCIe Card

WiFi Solution
- Industrial Grade Components Used
- CE, FCC, RoHS and REACH

	MEC-WIFI-M432B-H	MEC-WIFI-2532B-30
Solution	WiFi	WiFi
Form Factor	Half size	NGFF M.2 2230
Frequency Range	802.11 a/b/g/n/ac + Bluetooth 4.0	802.11 a/b/g/n/ac + Bluetooth 4.2 (A+E Key)
Chipset	Realtek RTL8812AE	Realtek RTL8822BE
Interface	Mini PCI Express	WLAN: PCIe 1.1 Bluetooth: USB2.0
T/R	2T2R	2T2R
Dimensions W x L	29.85 x 26.65 mm	30.0 x 22.0 mm
Operating Temp.	0^0C~$+85^0$C	0^0C~$+85^0$C
Driver Support	Win 7, Win 8, Win 10, Linux, Android	Win 7, Win 8 Win 10, Linux, Android

Product specifications are subject to change without prior notice.

Accessory

U.fl/IPX to RP SMA Cable

- Applications : WiFi
- Frequency Range : 0-6 GHz
- Length : 8cm/ 30cm

	MCB-RPSMAIPX-8	MCB-RPSMAIPX-30
Type	Cable	Cable
Interface	According to IBC 60169-15	According to IBC 60169-15
Characteristic Impedance	50±1 ohm	50±1 ohm
Frequency Range	0-6GHz	0-6GHz
Rated. Voltage	60V	60V
Test. Voltage	200V	200V
Dielectric Resistance	>500MΩ	>500MΩ
Durability	Mating Cycles > 500	Mating Cycles > 500
Temperature Range	-40^0 C~+85^0 C	-40^0 C~+85^0 C
Length	8 cm	30 cm

Product specifications are subject to change without prior notice.

Accessory

RP- SMA Jack + 1.13mm IPEX4 Cable

- Applications : WiFi (M.2)
- Frequency Range : 2-6 GHz
- Length : 30cm

MCB-RPSMAIPX4-30

Type	Cable
Frequency Range	2-6 GHz
Insertion Loss	< 2dBi
V.S.W.R	1.5 : 1 Max
Connector	I-PEX MHF4 & SMA Jack Reverse
Cable	φ 1.13mm
	Length: 30cm
Temperature Range	-20^0 C~+65^0 C
Composite	80% @-10^0 C~+55^0 C

Product specifications are subject to change without prior notice.

Accessory

Rubber Duck Antenna

- Applications : WiFi
- Frequency Range : 2400-2483.5 MHz / 5150-5850 MHz
- Bandwidth : 83.5 MHz / 700 MHz

AT-AN2450-R

Type	Antenna
Frequency Range	2400-2500 MHZ / 5000-6000 MHZ
Gain (dBi)	2dBi / 5dBi
V.S.W.R.	≤ 1.8 : 1
Max Power	50W
Polarization	Linear Vertical
Nominal Impedance	50Ω
Connector	RP-SMA
Antenna Type / Form	Dipole / Flat Type
Dimension (L x W x H)	160 x 17.8 x 13.7 mm

Product specifications are subject to change without prior notice.

Accessory

Half to Full Mini-Card Bracket

- Aluminum

Accessory

M.2 2280 NVMe Heatsink Kit

- Aluminum

	Metal Baffle	HM8ALK
Type	Metal Baffle	Heatsink Kit
Material	Aluminum	Aluminum
Dimensions (L x W x H)	24.15 x 29.15 x 2.2 mm	70.0 x 23.6 x 11.3 mm
Features	Half to Full Mini-Card Bracket	Heatsink Cooling Metal Sheet Thermal Pad
		for M.2 NGFF 2280 PCIe NVMe SSD
Package Includes	1 x Metal Baffle	1 x Heatsink
	4 x Screw	1 x Bottom Cover
		2 x Thermal Pad

Product specifications are subject to change without prior notice.