ATP Electronics, Inc.

Product Guide

DRAM & Flash Products

FLASH CARD

DRAM MODULE

SSD

EMBEDDED MODULE

ATP GLOBAL SUPPORT OFFICES

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About ATP

Established in 1991, ATP has accumulated many years of experience in the design, manufacturing, and support of high performance, highest quality DRAM modules and NAND flash storage products. ATP focuses in mission critical applications such as industrial/automation, telecom, medical, automotive, and enterprise computing where high levels of technical support/expertise, consistency of performance, and manufacturing quality are required. A certified Eco/Green partner of tier one OEMs, all ATP products are fully RoHS and China RoHS compliant. A true manufacturer of both flash and DRAM products, ATP offers in-house design, testing, and product tuning at both the system and component levels. In addition, ATP supply chain support includes controlled/fixed BOMs and long term product life cycles.

ATP System-In-Package (SIP) flash product manufacturing process is the backbone to superior build quality and durability. The industry leading SIP process involves advanced wire bonding, stacking, and encapsulation stages which make ATP products consistently durable and reliable under harsh environment such as moisture, extreme temperature and electrostatic discharge.

A technology driven company, ATP continues to expand its product portfolio with new unique features such as "SMART Life Monitor" which reflects the remaining life of flash storage devices, before the wear of the NAND flash, in order to prevent sudden failures of the storage device. "Secure Erase" is designed for complete block-by-block erase in case of government and military heightened security requirements. ATP "Secure Erase" offers a diverse variety of military and industrial protocols, ranging from NAVSO P-5239-26, IREC (IRIG) 106, USA-AF AFSSI 5020 to USA-Army 380-19.

The ATP brand continues to grow through the industrial OEM sales channels. With multiple offices in USA, Europe, and Asia, ATP offers worldwide support in both engineering and sales.

## Industry Association and Compliance

Why ATP

■ Extended & Long Term Product Longevity

During Design Phase, ATP provides:
■ Partnership to find the right balance of technology leadership, cost effectiveness, and long term stability
■ Controlled BOM with ½ year notifications on die revision changes
During Sustaining Phase, ATP provides:
■ Mass production volume taking cost/availability advantage of mainstream technology standards, form factors and IC configurations
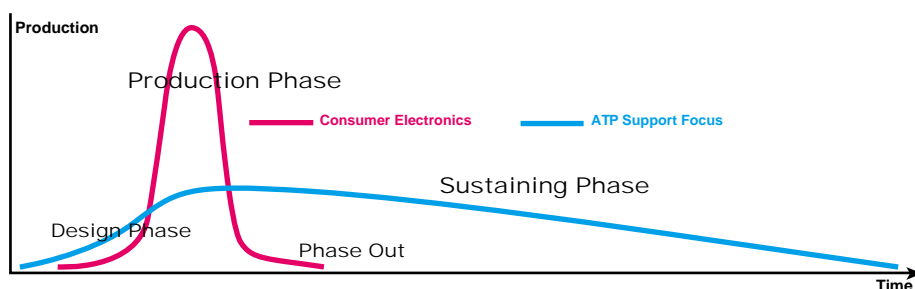
■ Micron PLP Program – Long Life Cycle DRAM and Flash Product

■ Based on IC components from Micron's Product Longevity Program (PLP), ATP is committed to providing guaranteed and extended product life cycles of up to 10 years.
■ The longer life cycle addresses the supply chain requirements of mission-critical applications.
■ Micron' PLP offers the stability necessary for ATP's module solutions to meet the challenges and help our customers reduce the frequency of painful re-design and re-qualification.

■ The Management of Total Cost of Ownership (TCO)

■ ATP ensures the product life cycle and quality at the beginning of project to manage the TCO.
■ Endurance and retention evaluations are initiated to provide the most cost-effective option to customers.
■ The TCO service facilitates project level communication which consequently minimizes the cost associated with the solution.

■ Customization

■ Customized module and flash designs
■ Electronic design and manufacturing services (EDMS)
■ Patented security features
■ Conformal coating
■ JEDEC compliant, customization/SPD tuning available

■ Sales & Engineering Support

■ Efficient, competent and professional sales staff to serve your needs
■ Application specific design and customization to meet your specific requirements
■ Fast turn-around samples and production orders
■ Global manufacturing facilities, technical support, and logistics support including experience with contract manufacturer coordination

■ Controlled Bill of Materials (BOM)

■ Quality and engineering documentation provided
■ Long product life cycle with buffer inventory support and advance PCN/EOL

■ 100% Tested for Reliability and Consistency

■ Extended and industrial temperature testing
■ Environmental testing
■ Application testing

ATP Market Focus & Applications

ATP products are fully RoHS and China RoHS compliant. A true manufacturer of both flash and DRAM products, ATP offers in-house design, testing, and product tuning at both the system and component levels. In addition, ATP supply chain support includes controlled/fixed BOMs and long term product life cycles.

Industrial PC/Embedded

In high-performance Industrial PC and embedded applications, demand for faster data transfer rate and higher bandwidth is increasing.

At the same time, constraints on space, endurance, reliability and power are rising. Industrial/Embedded computing storage and memory implementations require a level of technical support and product tunability that only a true designer/manufacturer can offer.

ATP designs, builds, and supports all of its own DRAM and flash products. With full control of the BOM, testing, and QA procedures, ATP can customize, build, and tune a storage/memory solution for the most demanding or unique embedded application.

Applications
• Industrial Automation
• Factory Machinery
• Industrial PCs
• Data Logging

Networking

The dynamic pace of the networking industry demands a memory product supplier with the flexibility of application-specific, in-house design and supply chain support for rapid deployment as well as controlled Bill of Materials (BOM) and long term availability. ATP provides highly durable, reliable DRAM and Flash total solutions with these demands in mind.

ATP has accumulated many years of experience in the design, manufacturing, and support of high performance, highest quality DRAM modules and flash products for mission critical networking applications, where high levels of technical support, consistency of performance, and manufacturing quality are required.

With the continued development of NAND flash technologies, the performance gain of solid state storage over traditional hard drives is vast. This is especially true in many networking environments which have typically higher traffic with extremely high number of concurrent transactions. ATP industrial Grade SSDs and embedded modules offer these performance gains in IOPS and also employ the newest wear leveling, data integrity and power failure protection technologies.

Applications
• WAN Optimization Appliances
• Firewall/Next-Gen Firewalls
• Unified Threat Management (UTM)
• High Performance Storage Caching
• VPN/Firewall Appliances
• PBX/IPBX
• Routers/Gateways
• Servers

Enterprise Mobility

ATP is a leader in enterprise mobility, providing storage and memory products that are robust enough for harsh conditions and extreme environments. Enterprise mobility devices require more than just brute physical durability but also require storage and memory that are electrically sound for less than ideal and often unreliable power sources.

ATP Industrial Grade memory cards built with SIP (System-in-Package technology) offer considerable protection from harsh environmental conditions and provide water, dust, and ESD proof durability.

ATP memory cards provide features such as low power consumption, power interruption protection, and wide input voltage, making the cards ideal for enterprise mobility applications.

ATP Industrial Grade memory cards have been previously tested and qualified by major enterprise mobility companies such as Intermec, Motorola, and Honeywell.

Applications
• Mobility ERP
• Mobile Data Collection
• Barcode Scanning
• Mobile Payment
• Rugged Handheld Computing
• RFID
• Two-Way Radios
• Field Mobility
• Mobile Healthcare

Automotive

Quality, controlled BOM and long term support are key factors to customers in the automotive industry.

Automotive applications require long term data retention and product lifetimes as well as high tolerance for extreme environmental conditions of temperature, shock, vibration, and humidity.

Automotive applications also require the stringent ISO/TS 16949 standard, the international quality management certification specifically written by the automotive industry. Furthermore, automotive parts and components should be listed in the International Material Data System (IMDS).

ATP flash products are built with prescreened, endurance tested SLC or MLC flash components and are built for maximum product lifetimes and long term data integrity.
These components together with ATP's SIP (System-In-Package) technology allow for long term performance in all environments and harsh physical conditions.

Applications
• In Vehicle Infotainment
• Fleet Surveillance
• In Vehicle Computer
• Fleet Management
• Telematics Automotive Insurance

ATP Market Focus
& Applications

Military/Aerospace

Military/Aerospace implementations of memory and solid state storage require products that can perform under the harshest and most unforgiving environments. Extreme temperature, vibration, and shock stresses are among a few of the tolerances needed to be taken into account. ATP flash products, built with SIP (System-in-Package technology) offer considerable protection from these elements along with waterproof, dust, and ESD proof durability. Each ATP industrial grade BOM configuration goes through extensive temperature shock, humidity, ESD, and physical stress testing before being considered for production.

ATP, a true manufacturer, can offer long term supply chain support for military applications where implementation and servicing components are needed for years, even decades.

ATP content copy protection and write protection technologies also allow for secure content distribution or recording.

Applications
• GPS Navigation
• In Vehicle Computer
• Rugged Computing
• Surveillance/Media Recording
• Secure Content Distribution
• Rugged Personal Storage

Telecommunication

ATP's partners in Telecommunication typically have the highest demands in terms of raw performance, capacity, and reliability.

ATP FAE and Engineering teams have the expertise and support experience to both recommend and test any system configuration for maximum performance and reliability, with all factors such as heat/air flow, electrical demands, and DRAM module timing considered.

For space constrained small cell applications, the ATP Industrial Grade microSD card with advanced power abnormality protection is an ideal discrete/RAW NAND replacement, allowing for managed NAND with supply chain flexibility.

ATP Industrial Grade microSD cards are tested rigorously with Motorola in Motorola Solutions Independent Hardware Vendor (IHV) program, ensuring interoperability and reliability, thus also highlighting the two companies' strong engineering partnership.

Furthermore, ATP also provides Industry leading production level TDBI (Test during Burn In) capability and usage specific solution evaluation and design consultation services. The result is tremendous performance with predictable lifetime and reliability. ATP focuses on module level value added capabilities and services. In the fast moving, dynamic world of DRAM and NAND flash, ATP introduces a form of control to allow for longer term stability and planning for the telecommunication industry.

Applications
• AdvancedTCA System
• Small Cell
• Compact PCI
• Blades
• VME

Healthcare

Healthcare storage demands are not only mission critical but often require data integrity in environments with exposure to water and fluids.

ATP Industrial Grade Memory Cards, built with SIP (System-in-Package technology) are fully waterproof and ideal for these conditions. Medical monitoring/recording devices often also require high transfer speeds for high resolution video and image capture. ATP DRAM products are built with the highest performance DRAM IC components while ATP Industrial Grade Flash products allow for industry leading read and write transfer speeds. ATP mSATA Embedded Modules allow for read speed of up to 258 MB/s and write speed of up to 220 MB/s, while ATP SSDs get into 500 MB/sec.

Applications
• Fetal Monitoring
• Mobile Healthcare
• Computed Tomography System
• Magnetic Resonance Imaging System
• Molecular Imaging/Nuclear Medicine
• Radiation Oncology
• Sonogram/Ultra Sound
• Life support/Data Logging
• Angiography
• Fluoroscopy
• Mammography

Surveillance

Video surveillance applications are not only limited to security and law enforcement, but also well utilized in the domains of civil infrastructure, commercial, industrial and residential buildings. Surveillance systems require a comprehensive range of features and capabilities, including enhanced image quality, greater camera angles, high capacity video archiving, gigapixel camera recording, and digitalized video systems.

ATP NAND Flash memory allows for quick access to large amounts of audio, video and image data. Embedded modules are ideal for fast boot up, or rapid data transfer, with high reliability and quick response time. Solid state drives (SSD) are ideal for image processing due to the absence of moving parts, low power consumption, and the rugged design factor.

Applications
• Homeland Security
• In-vehicle Surveillance
• Law Enforcement
• Insurance

Gaming

ATP DRAM and Flash storage solutions are used in gaming consoles and other gaming devices to expand the storage capacity and also to sustain speedy random read and write operations with flexible form factors, such as SD cards, or mSATA. ATP SSDs have also become the ultimate configuration of 3D gaming equipment for their extraordinary I/O performance and lasting endurance. With years of experience working with major gaming console manufactures, ATP provides custom designs for patented form factors and application-specific firmware.

Applications
•Game consoles
•Slot machines
•Gaming servers

DRAM Solution

High Performance DRAM Modules for Mission Critical Applications
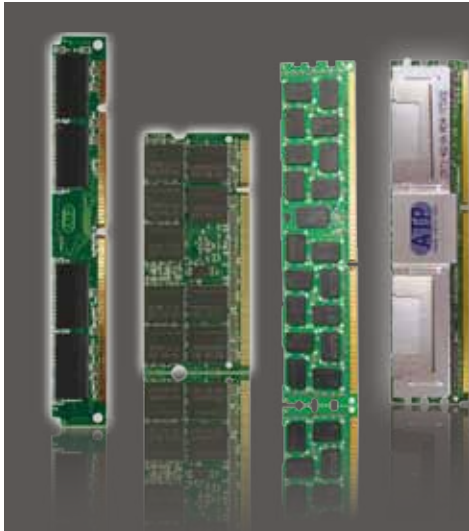
ATP strives for strictly controlled quality standards, the highest level of technical support and a controlled BOM (Bill of Materials) and thus continuously offers the highest quality, performance and reliability of DRAM products to the market where mission-critical applications require the most reliable modules.

Key Features

- JEDEC compliant
- Conformal coating available for environmentally rugged applications
- Long term supply chain commitment upon module qualification
- Industrial grades available (-40°C to +85°C)
- Simulation model files available upon request
- Customization/SPD tuning available

Major IC Providers

Certified by MotherBoard Manufacturers

Complete DRAM Product Line

Product	Category	Speed (MHz)	Form Factor	Features
DDR3	LRDIMM	1866 1600 1333 1066	• Low profile • Very Low Profile (VLP) options (VLP: 0.74" height) • Ultra Low Profile (ULP) options (ULP: 0.7"~0.72" height)	• Capacities supported from 1GB to 16GB • Chipkill support • High performance data rate up to 1866 MT/s • Standard 1.5 V and 1.35 V low voltage options **LRDIMM** • Capacities supported from 16GB to 32GB
	RDIMM			
	UDIMM ECC			
	UDIMM			
	SO-RDIMM			
	SO-RDIMM ECC			
	SO-UDIMM			
	mini-RDIMM			
	mini-UDIMM ECC			
DDR2	RDIMM	800 667 533 400	• Low Profile • Very Low Profile (VLP) options (VLP:0.72"~0.74" height)	• Capacities supported from 512MB to 8GB • Chipkill support • Single, dual and quad rank options **FBDIMM** • Capacities supported from 1GB to 8GB • Chipkill support • Low power and low voltage options • Apple FB-DIMM
	UDIMM ECC			
	UDIMM			
	SO-RDIMM			
	SO-CDIMM			
	SO-UDIMM			
	mini-RDIMM			
	FB-DIMM			
DDR1	RDIMM	400 333 266	• Low Profile • Very Low Profile (VLP) options (VLP:0.72"~0.74" height)	• Capacities supported from 256MB to 2GB • Chipkill support
	UDIMM ECC			
	UDIMM			
	SO-RDIMM			
	SO-CDIMM			
	SO-UDIMM			
SDRAM	RDIMM	PC 133 PC 100	• Low Profile • Very Low Profile (VLP) options (VLP:0.72"~0.74" height)	• Capacities from 256MB to 1GB • Chipkill support • Legacy system support
	UDIMM ECC			
	UDIMM			
	SO-UDIMM			

Product Portfolio	Category	Speed	Features
Industrial Grade Family	SO-DIMM	DDR3 DDR2 DDR1 SDRAM	• Extended temperature: -40°C ~ +85°C • Controlled BOM and SPD • For mission critical industrial applications
	UDIMM		
	RDIMM		

DRAM Solutions

ATP DRAM Modules are specifically designed and engineered in three different grades for various industrial and enterprise applications.

DRAM Product Categories

	Server Grade	Enterprise Grade	Industrial Grade
Production Level Test	System Test Only	Elevated Temp Burn In	Elevated Temp Burn In
Operating Temperature Range	Commercial 0°C to +85°C*	Commercial 0°C to +85°C*	Industrial -40°C to +85°C
Die Transition Window	One Month	One Quarter, One Year for PLP-based Products	One Quarter, One Year for PLP-based Products

*The operating temperature of some legacy products, such as SDRAM and DDR2, is from 0~70°C

Enterprise Grade DRAM Modules with Elevated Temperature Burn-In Testing (TDBI)

Key Features

- Industry leading product quality for use in mission critical applications
- 100% tested under elevated temperature to reduce field failures due to fringe manufacturing defects and IC infant mortality
- Patent Pending Thermal Chamber Design allows for:
  - Flexibility in thermal testing profile (-40°C to +85°C)
  - Flexibility in data-pattern testing profile (Customer specific software/scripts)
  - Supply Chain Traceability to testing profiles
 - Designed for production level efficiency and scalability

ATP Facility with Elevated Temperature Burn in Testing System (TDBI)

The Elevated Temperature Burn in System is a unique ATP built thermal testing chamber which allows for customer specific temperature profiles and also features a flexible monitoring and control system known as SCADA (Supervisory Control and Data Acquisition). The design of the thermal chamber allows for a higher level of production level efficiency, scalability and flexibility. The thermal testing profile can be tested up to 85° Celsius, and the data pattern testing profile is flexible with customer specific software. The testing profile allows for supply chain traceability to testing profiles using the SCADA system.

What is SCADA (Supervisory Control and Data Acquisition)?

● Remote monitoring and control over thermal burn-in testing array
● Real time monitoring of testing cycle status on all systems
● Database containing all profiles, test cycles, and production logs for QA traceability
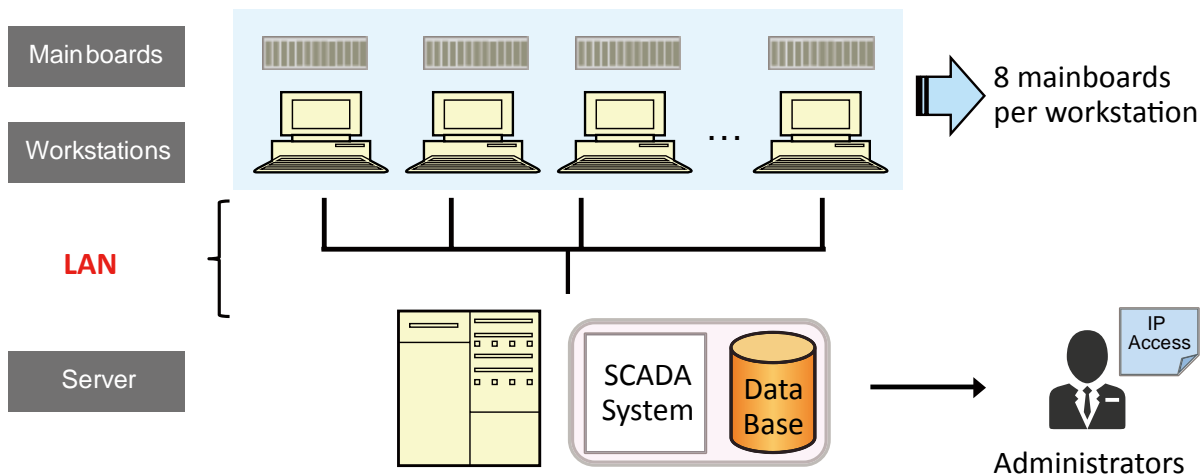
Flash Solutions

ATP industrial grade flash products are specifically designed and engineered to perform consistently under conditions of extreme temperature, shock, vibration, and humidity.

All ATP industrial grade flash products are optimized for demanding industrial applications such as automotive, healthcare, telecommunication, networking and military, where crucial data requires the highest level of reliability, durability and data integrity.

ATP Prominent Technology

Life Monitor
• Offers flash health status feed back to the host.
• Prevents data failure by proactively detecting the percentage of remaining life in the storage device, allowing users time for safe storage retire-ment and replacement.

PowerProtector
• Back up power circuit ensures reliable controller and NAND flash operation during a power failure.
• Stand alone hardware based design supports multiple form factors (eUSB, CF, SSD), wide temp, ranges and longer life spans, exceeding the performance and reliability offered by existing supercap designs.

Secure Erase
• Initiates a block-by-block, data pattern write operation to systematically eliminate any trace of the original data.
• The ATP software application ensures that the declassification becomes quicker, easier and more effective for SSD's and flash based storage devices.

System-In-Package
All ATP Industrial Grade Memory Cards are manufactured with ATP's System In Package (SIP) process, which encapsulates all of the exposed components and points of failure to protect against water, moisture, vibration/shock, electrostatic discharge and extreme temperatures.
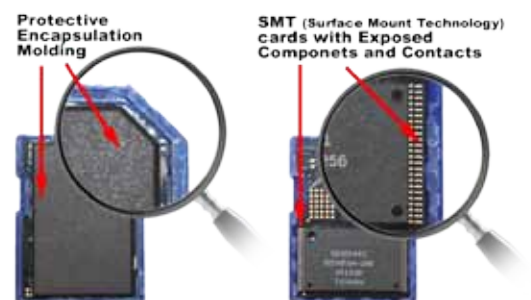
Complete Flash Product Line

Product		Dimensions (L x W x H mm)	Flash Type	Densities	Operating Temp.	Data Transfer Rate (max.)	TBW* (max.)	Life Monitor	Power Protector	Secure Erase
SATA										
SSD Velocity SI Pro		100.0 x 69.9 x 9.5	SLC	30GB~240GB	-40˚C~+85˚C	Read: 500 MB/s Write: 500 MB/s	8,000TB	✓	Optional	✓
SSD Velocity M IV		100.0 x 69.9 x 9.5	MLC	60GB~480GB	0˚C~+70˚C	Read: 500 MB/s Write: 500 MB/s	480TB			
SSD Velocity SI Lite		100.0 x 69.9 x 9.5	SLC	4GB~64GB	-40˚C~+85˚C	Read: 258 MB/s Write: 220 MB/s	640TB	✓	✓	✓
SSD Velocity M IV Lite		100.0 x 69.9 x 9.5	MLC	64GB~128GB	0˚C~+70˚C	Read: 258 MB/s Write: 94 MB/s	76TB			
SlimSATA		54.0 x 39.0 x 4.0	SLC	2GB~32GB	-40˚C~+85˚C	Read: 112 MB/s Write: 91 MB/s	1,280TB	✓	✓	✓
			MLC	8GB~64GB	0˚C~+70˚C	Read: 120 MB/s Write: 40 MB/s	80TB			
SATA DOM (Vertical)		35.5 x 33.1 x 7.6	SLC	2GB~16GB	-40˚C~+85˚C	Read: 113 MB/s Write: 81 MB/s	640TB	✓	✓	✓
SATA DOM (Horizontal)		35.1 x 30.0 x 14.0	SLC	2GB~16GB	-40˚C~+85˚C	Read: 113 MB/s Write: 81 MB/s	640TB	✓	✓	✓
mSATA		50.8 x 29.8 x 3.4	SLC	4GB~64GB	-40˚C~+85˚C	Read: 258 MB/s Write: 220 MB/s	1,280TB	✓	✓	✓
			MLC	8GB~128GB	0˚C~+70˚C	Read: 258 MB/s Write: 94 MB/s	160TB			
CFast		42.8 x 36.4 x 3.6	SLC	2GB~32GB	-40˚C~+85˚C	Read: 140 MB/s Write: 110 MB/s	640TB	✓	✓	✓
CF										
Compact Flash		42.8 x 36.4 x 3.3	SLC	512MB~32GB	-40˚C~+85˚C	Read: 50 MB/s Write: 25 MB/s	640TB	✓	✓	✓
			MLC	4GB~32GB	0˚C~+70˚C	300X Read: 45 MB/s	19.2TB		-	
USB Drive										
eUSB		2.54mm 36.9 x 26.6 x 9.6 2.00mm 36.9 x 26.6 x 5.9	SLC	512MB~16GB	-40˚C~+85˚C	Read: 21 MB/s Write: 18 MB/s	320TB	✓	✓	-
			MLC	4GB~16GB	0˚C~+70˚C	Read: 27 MB/s Write: 19 MB/s	10TB			
USB Drive NANODURA		34 x 12.2 x 4.5	SLC	512MB~8GB	-40˚C~+85˚C	Read: 35 MB/s Write: 22 MB/s	96TB	-	-	✓
			MLC	4GB~16GB	0˚C~+70˚C	Read: 33 MB/s Write: 23 MB/s	9.6TB			
USB Drive Endura		33.7 x 17.5 x 9.4	SLC	512MB~8GB	-40˚C~+85˚C	Read: 35 MB/s Write: 22 MB/s	96TB	-	-	✓
			MLC	4GB~16GB	0˚C~+70˚C	Read: 33 MB/s Write: 23 MB/s	9.6TB			
SD Cards										
SD/SDHC		32.0 x 24.0 x 2.1	SLC	512MB~32GB	-40˚C~+85˚C	Read: 19 MB/s Write: 17 MB/s	384TB	✓	-	-
			MLC	4GB~32GB	-25˚C~+85˚C	Class 10 Read: 20 MB/s	19.2TB			
miniSD/ miniSDHC		21.5 x 20.0 x 1.4	SLC	512MB~4GB	-40˚C~+85˚C	Read: 18 MB/s Write: 13 MB/s	20TB	✓	-	-
microSD/ microSDHC		15.0 x 11.0 x 1.0	SLC	512MB~8GB	-40˚C~+85˚C	Read: 17 MB/s Write: 13 MB/s	48TB (4GB)	✓	-	-
			MLC	4GB~32GB	-25˚C~+85˚C	Class 10 Read: 20 MB/s	19.2TB			

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

Memory Cards

Industrial Grade CompactFlash Card

The ATP Industrial Grade CF card is compliant with CFA spec v4.1 which supports both Ultra DMA performance and TrueIDE modes. By utilizing high quality SLC NAND flash and the advanced Global Wear Leveling algorithm, ATP Industrial Grade CF cards have enhanced endurance and longer lifespans.

Industrial Grade CFast Card

With a form factor similar to CF and a faster and more advanced SATA interface, the ATP Industrial Grade CFast card is the ideal replacement of aging CF cards. The ATP Industrial Grade CFast card is fully compliant with CFA CFast specification version 1.1 and SATA 3 Gb/s interface. Compared to current Industrial Grade CF cards with ATA/IDE interface, the ATP Industrial Grade CFast card provides ultra high speed up to 140 MB/s (read) and 110 MB/s (write), around 3 times faster than CF cards.

CONTROLLED BOM
S.M.A.R.T.
POWER Protector
Secure Erase
EXTREME TEMPERATURE RESISTANCE
SHOCK PROOF
VIBRATION PROOF
E.S.D. PROOF
DATA INTEGRITY

Key Features

• SLC (Single-Level-Cell) NAND Flash with a longer lifespan
• Advanced Wear Leveling algorithm
• Bad Block Management
• StaticDataRefresh to ensure data integrity during read operation
• Support ATP Power Protector for data protection during power failure
• Support S.M.A.R.T. Life Monitor tool for remaining life check (Windows /Linux)

Specifications

Model Name	CompactFlash Card		CFast Card
Flash Type	SLC	MLC	SLC
Density	512MB~32GB	4GB~32GB	2GB~32GB
Interface	True IDE, PIO, MDMA, UDMA Mode		SATA 3 Gb/s
TBW* (Max)	640TB	19.2TB	640TB
Seq. Read/Write	UDMA Mode 4 Read: up to 50MB/s Write: up to 25MB/s	UDMA Mode 5 Read: Up to 45 MB/s	Read: up to 140 MB/s Write: up to 110 MB/s
Operation Temp.	-40°C to +85°C	0°C to +70°C	-40°C to +85°C
Dimensions (L x W x H)	42.8×36.4×3.3mm		42.8×36.4×3.6mm

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

Industrial Grade
SD/SDHC, miniSD/miniSDHC, microSD/microSDHC and USB Drive

ATP provides a wide range of Industrial Grade SD card series with built-in SLC (Single Level Cell) type NAND flash and advanced wear leveling algorithms which maximize flash component utilization. ATP offers technical support with an experienced FAE team and is dedicated to developing high quality and high reliability products with new technologies.

ATP implements **DataRefresh** technology, which activates data integrity protection by monitoring the error bits in read operations and **SD Life Monitor** tool, which allows users to identify the health status of the SD series cards.

DataRefresh technology and SD Life Monitor tool are available on select models.

Key Features

- SLC (Single-Level-Cell) NAND Flash with longer lifespan
- Bad Block Management
- StaticDataRefresh to ensure data integrity during read operation
- Support SD life monitor tool for lifespan check (Windows / Linux)
- Advanced Wear Leveling algorithm
- IP57/IP67 waterproof/Dustproof test (IEC 60529)
- Highly reliable and pass environmental test (Bend/Torque/Salt Spray/Solar radiation)
- ESD proof (IEC61000-4-2)

Specifications

Model Name	SD/miniSD/microSD		USB Drive
Flash Type	SLC	MLC	SLC
Density	SD: 512MB~32GB miniSD: 512MB ~ 4GB microSD: 512MB ~ 16GB	SD: 4GB ~ 32GB microSD: 4GB~32GB	ENDURA: up to 8GB NANODURA: up to 8GB
Interface	SD 1.1, SD 2.0		USB 2.0
TBW* (Max)	384TB	19.2TB	96TB
Seq. Read/Write	Read: up to 19 MB/s Write: 17 MB/s (120x)	Class 10 Read: up to 23 MB/s (150X)	Read: up to 35 MB/s, Write: up to 22 MB/s
Operation Temp.	-40°C to +85°C	-25°C to +85°C	-40°C to +85°C
Dimensions (L x W x H)	SD: 32 x 24 x 2.1 mm miniSD: 21.5 x 20x 1.4 mm microSD: 15 x 11 x 1 mm		ENDURA: 33.7×17.5×9.4mm NANODURA: 34×12.2×4.5mm

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

CONTROLLED BOM

S.M.A.R.T.

POWER Protector

Secure Erase

EXTREME TEMPERATURE RESISTANCE

SHOCK PROOF

VIBRATION PROOF

E.S.D. PROOF

WATERPROOF

SIP

Embedded Flash Modules

SATA DOM

The ATP Horizontal/Vertical SATA DOM provides ultra-fast performance by utilizing the SATA interface with a read speed of 113 MB/s and write speed of 81 MB/s. The module utilizes an industrial grade temperature SLC (Single-Level Cell) NAND flash, providing an extended operating temperature range of -40°C to +85°C. It can simply be plugged into the standard SATA 7-pin connector commonly found on newer generation motherboards, thus making it ideal for fanless computers, panel PC, industrial PC and thin client systems. The ATP Horizontal/Vertical SATA DOM has multiple connector configurations to fulfill various ME design limitations of motherboards.

Key Features

● Compliant with Serial ATA Revision 2.6
● Compatible with SATA 1.5 Gb/s and SATA 3.0 Gb/s interface rates
● Enhanced endurance with Global Wear-Leveling
● Supports S.M.A.R.T. ATA feature set
● S.M.A.R.T. tool available for Windows, 2000, XP, Vista, Windows 7, Linux
● RoHS compliant and CE/FCC certification
● Built-in hardware-based data protection technology during power failure - PowerProtector

Specifications

Model Name	Horizontal SATA DOM	Vertical SATA DOM
Flash Type	SLC	
Density	2GB~16GB	
Interface	SATA 1.5 Gb/s and SATA 3.0 Gb/s	
TBW* (Max)	640TB	
Seq. Read/Write	Read: up to 113 MB/s, Write: up to 81 MB/s	
Operation Temp.	-40˚C to +85˚C	
Dimensions (L x W x H)	35.1 x 30.0 x 14.0 mm	35.5 x 33.1 x 7.6 mm

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

CONTROLLED BOM

S.M.A.R.T.

POWER Protector

Secure Erase

EXTREME TEMPERATURE RESISTANCE

SHOCK PROOF

VIBRATION PROOF

E.S.D. PROOF

SlimSATA

The ATP SlimSATA Embedded Module adheres to the JEDEC standard, MO-297, as well as industry compliance and regulatory standards including CE, FCC and RoHS. With its small form factor and high density, the ATP SlimSATA Embedded Module is an ideal replacement for 2.5" HDD in industrial storage applications. It offers an alternative for space constrained embedded applications, such as IPC, Blades, AdvancedTCA, Networking equipments, and POS machines, with enhanced performance and reliability.

Key Features

- JEDEC standard: MO-297 (Slim SATA) complaint
- Enhanced endurance with Global Wear Leveling
- Built-in hardware-based data protection technology during power failure - PowerProtector
- Supports S.M.A.R.T. ATA feature set
- S.M.A.R.T. tool available for Windows, 2000, XP, Vista, Windows 7, Linux
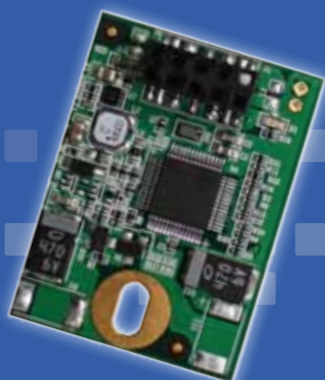- RoHS compliant and CE/FCC certification

Specifications

Model Name	Slim SATA	
Flash Type	SLC	MLC
Density	2GB~32GB	4/8/64GB
Interface	SATA 1.5 Gb/s and SATA 3.0 Gb/s	
TBW* (Max)	1,280TB	80TB
Seq. Read/Write	Read: up to 112 MB/s, Write: up to 91 MB/s	Read: up to 120 MB/s, Write: up to 40 MB/s
Operation Temp.	-40˚C to +85˚C	0˚C to +70˚C
Dimensions (L x W x H)	54.0 x 39.0 x 4.0 mm	

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

CONTROLLED BOM

S.M.A.R.T.

POWER Protector

Secure Erase

EXTREME TEMPERATURE RESISTANCE

SHOCK PROOF

VIBRATION PROOF

E.S.D. PROOF

Embedded Flash Modules

Z-U130 eUSB SSD
Pin-Pin Replacement for Intel ® Z-U130 Value SSD

The ATP Z-U130 eUSB SSD is a Pin-for-Pin replacement for Intel's Z-U130 Value SSD. Applications include server, storage, networking, telecommunications, medical and embedded computing, which previously used Intel's Z-U130 Value SSD. The ATP Z-U130 eUSB SSD provides an ultra high performance SLC (Single Level Cell) NAND flash with a sequential read of up to 21 MB/s, and sequential write of up to 18 MB/s. The optional low-profile (36.9 x 26.6 x 5.9 mm) of the eUSB SSD easily integrates into small footprint IPC systems or embedded applications with little or no excess space. In addition, ATP pushes the envelope further by offering the wide temperature version of eUSB SSD with an operating temperature range of -40oC to +85oC degrees Celsius.

Using a known, proven interface such as a USB instead of another proprietary interface provides a shorter design process and time-to-market advantages. With its easy to implement USB interface and small form factor design, the ATP eUSB SSD is a reliable and high performance storage solution for mission critical industrial applications.

Key Features

- Product flexibility as a boot drive
- Enhanced endurance with Global Wear Leveling
- Built-in hardware-based data protection technology during power failure - PowerProtector
- RoHS compliant and CE/FCC certification
- Supports S.M.A.R.T. ATA feature set
- S.M.A.R.T. tool available for Windows, 2000, XP, Vista, Windows 7, Linux

Specifications

Model Name	Z-U130 eUSB SSD	
Flash Type	SLC	MLC
Density	512MB~16GB	4GB~16GB
Interface	USB 2.0 and USB 1.1	
TBW* (Max)	320TB	10TB
Seq. Read/Write	Read: up to 21 MB/s, Write: up to 18 MB/s	Read: up to 27 MB/s, Write: up to 19 MB/s
Operation Temp.	-40˚C to +85˚C	0˚C to +70˚C
Dimensions (L x W x H)	Standard: 36.9×26.6×9.6mm , Low Profile: 36.9×26.6×5.9mm	

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

mSATA

With its compact size, high performance and conformity with JEDEC standard MO-300A, the mSATA Industrial Grade Embedded Module is ideal for mission-critical embedded storage applications that have space constraints and require high performance and reliability. The mSATA design is based on the JEDEC standard MO-300A with the ubiquitous SATA-II, 3 Gbps interface. Measuring only 2.0 x 1.2 inches (50.8 x 29.8 mm) mSATA SSDs are extremely compact and lightweight.

The mSATA Industrial Grade Embedded Module uses an existing mini PCIe connector with a modified SATA pinout. The mSATA Industrial Grade Embedded Module offers an alternative solution for space constrained embedded applications. These include IPC, automation, Blades, AdvancedTCA, PC/104, Networking, digital signages, rugged notebooks, and enhances the capability, performance and reliability of all the aforementioned mission critical applications.

Key Features

• Adheres to the JEDEC mechanical specification MO-300A
• Built-in hardware-based data protection technology during power failure - PowerProtector
• Ultra high performance solution for small form factor embedded and industrial applications
• RoHS compliant and CE/FCC certification
• Supports S.M.A.R.T. ATA feature set
• S.M.A.R.T. tool available for Windows, 2000, XP, Vista, Windows 7, Linux

Specifications

Model Name	mSATA	
Flash Type	SLC	MLC
Density	4GB~64GB	8GB~128GB
Interface	Compatible with SATA 1.5Gb/s and SATA 3.0Gb/s	
TBW* (Max)	1,280TB	160TB
Seq. Read/Write	Read: up to 260 MB/s, Write: up to 220 MB/s	Read: up to 258 MB/s, Write: up to 94 MB/s
Operation Temp.	-45°C to +85°C	0˚C to +70˚C
Dimensions (L x W x H)	50.8 x 29.8 x 4.0 mm	

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

2.5" SATA SSD

Velocity SI Pro

The ATP Velocity SI Pro SSD with SATA III interface and SLC NAND Flash, provides sequential read speed of 500 MB/s, sequential write speed of 500 MB/s, 4K random read IOPS of 60,000, and TBW of 8,000TB (240GB). The SI Pro is optimized for enterprise and industrial grade storage applications requiring high performance and endurance.

Key Features

- Ideal for high bandwidth/IOPS requirement applications
- Ideal for heavy program/erase applications
- High Performance: 500 MB/sec Read/Write, with SATAIII interface
- Onboard 128 bit AES Encryption
- Built-in hardware-based data protection technology during power failure - PowerProtector
- Random Read IOPS up to 60K, Random Write IOPS up to 78K, Sequential Write IOPS up to 20K
- NSA Compliant SecureErase and Quick SecureErase
- High TBW (Total Bytes Written) Rating: 4000TB (120GB), compared to Intel 710 at 500TB (100GB)
- MIL-STD-810G compliant

Specifications

Model Name	SI Pro SSD
Flash Type	SLC
Density	30GB~240GB
Interface	SATA 1.5Gb/s, SATA 3.0Gb/s and SATA 6.0Gb/s
TBW* (Max)	8,000TB
Seq. Read/Write	Read: up to 500 MB/s, Write: up to 500 MB/s
Operation Temp.	-40˚C to +85˚C
Dimensions (L x W x H)	100.0 x 69.9 x 9.5 mm

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

Velocity M IV
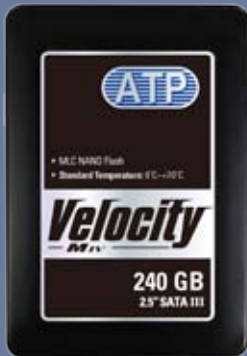
Utilizing MLC (Multi Level Cell) NAND flash components, the ATP Velocity M IV Enterprise Grade SSD offers ultra high speed with a sequential read up to 500 MB/s and sequential write up to 500 MB/s. The ATP Velocity M IV Enterprise Grade SSD is designed for enterprise and enterprise storage systems with outstanding sequential read and write performance to relieve performance bottlenecks associated with traditional HDD storage or other slower MLC SSDs. ATP Velocity M IV Enterprise Grade SSD brings new life into embedded and enterprise storage infrastructures.

Full Manufacturer Support and Product Consistency

Being a true manufacturer gives ATP the ability to support customers with a controlled BOM (Bill of Materials) policy, ensuring both consistent compatibility and performance. ATP also fully supports its customers with product customization and tuning to optimize performance in particular or specialized applications.

Key Features

- SATA 6.0 Gb/s interface and backward compatible to SATA 3.0 Gb/s and 1.5 Gb/s
- TBW (Total Bytes Written) rating = 120 TB, compared to the Intel 320 SSD at 60TB (both are MLC at 120GB)
- Random Read IOPS up to 60K, Random Write IOPS up to 59K, Sequential Write IOPS up to 20K
- NSA Compliant SecureErase and Quick SecureErase
- Designed for enterprise applications requiring high endurance on MLC technology
- ATP PowerProtector for data protection under unexpected power failures
- System Level endurance/reliability testing
- Global Wear Leveling algorithm
- AES 128 bit encryption
- MIL-STD-810G compliant

Specifications

Model Name	M IV SSD
Flash Type	MLC
Density	60GB~480GB
Interface	SATA 1.5 Gb/s, SATA 3.0 Gb/s, 6.0 Gb/S
TBW* (Max)	480TB
Seq. Read/Write	Read: up to 500 MB/s, Write: up to 500 MB/s
Operation Temp.	0˚C to +70˚C
Dimensions (L x W x H)	100.0 x 69.9 x 9.5 mm

* All TBW data listed are under random write scenario and based on the highest density available in each product line.

2.5" SATA SSD
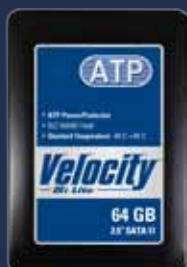
Velocity SI Lite

The ATP Velocity SI Lite SSD with SATA II interface is specifically designed and engineered for mission critical industrial applications, where high endurance and reliability are required. Utilizing SLC (Single Level Cell) NAND flash components, the ATP Velocity SI Lite SSD offers sequential read speed of up to 258 MB/s and sequential write of up to 220 MB/s. The Velocity SI Lite SSD is a cost-effective alternative for enterprise and industrial applications, where mission-critical data requires reliability, durability, performance and data integrity.
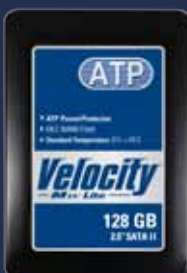
M IV Lite

The Velocity M IV Lite SSD is a cost-effective alternative for enterprise and industrial applications, where mission-critical data requires reliability, durability, performance and data integrity. Utilizing high quality MLC (Multi Level Cell) NAND flash components, the ATP Velocity M IV Lite SSD offers sequential read speed of up to 258 MB/s and sequential write of up to 94 MB/s.

Key Features

- Built-in hardware-based data protection technology during power failure - PowerProtector
- 2.5" SATA II form factor
- Operating Temperature: M IV Lite: 0°C~+70°C, SI Lite: -40°C~+85°C
- Compatible with SATA 1.5 Gb/s and SATA 3.0 Gb/s interface
- Support ATP SMART Life Monitor
- Global Wear Leveling
- NSA Compliant SecureErase

Specifications

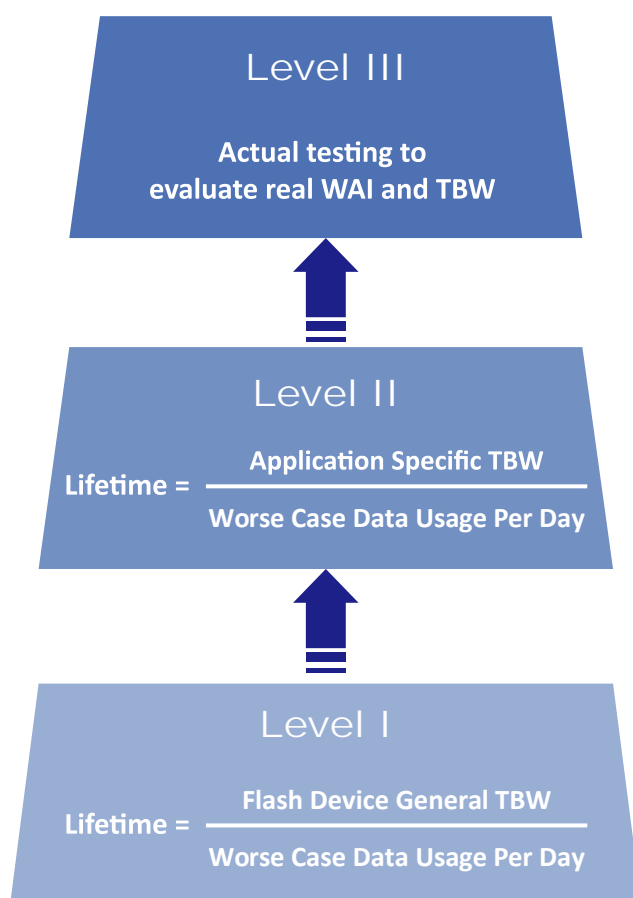| Model Name	SI Lite SSD	M-IV Lite SSD
Flash Type	SLC	MLC
Density	4GB~64GB	64GB~128GB
Interface	SATA 1.5 Gb/s, SATA 3.0 Gb/s	
MTBF (@25˚C)	>1,000,000 Hours	
Seq. Read/Write	Read: up to 258 MB/s, Write: up to 220 MB/s	Read: up to 258 MB/s, Write: up to 94 MB/s
Operation Temp.	-40˚C to +85˚C	0˚C to +70˚C
Dimensions (L x W x H)	100.0 x 69.9 x 9.5 mm	

Three Levels of Endurance Calculations

With years of experiences co-working with the various industrial sectors, ATP is able to provide a complimentary consulting service. Based on the three levels of endurance calculations, ATP can analyze the actual application data and provide the best solution for an optimized total cost of ownership.

Compared to the current mean time between failure (MTBF) , "Lifetime Calculation", based on Total Bytes Written (TBW) and Write Amplification Index (WAI) information, provides a more meaningful measure of a flash product's endurance. ATP has developed a sophisticated set of methods:

Level 1 is utilized for preliminary evaluation and Level 2 is given for flash device solution selection. Once the solution is selected, a Level 3 evaluation can be performed to confirm actual usage/project WAI. Candidate flash devices selected from the Level 2 prediction are run in the final host device to determine the most suitable solutions in the Level 3 evaluation.

Level III

Actual testing to evaluate real WAI and TBW

Level II

$$\text{Lifetime} = \frac{\text{Application Specific TBW}}{\text{Worse Case Data Usage Per Day}}$$

Level I

$$\text{Lifetime} = \frac{\text{Flash Device General TBW}}{\text{Worse Case Data Usage Per Day}}$$

ATP Electronics, Inc.