ATP Velocity SI Pro 2.5” SATA SSD Specification

Version 1.1

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Revision History

Date	Version	Changes compared to previous issue
Dec. 19th, 2011	1.0	- First release
Jan. 5th, 2012	1.1	- Revise P/N and image to PowerProtector only

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Introduction

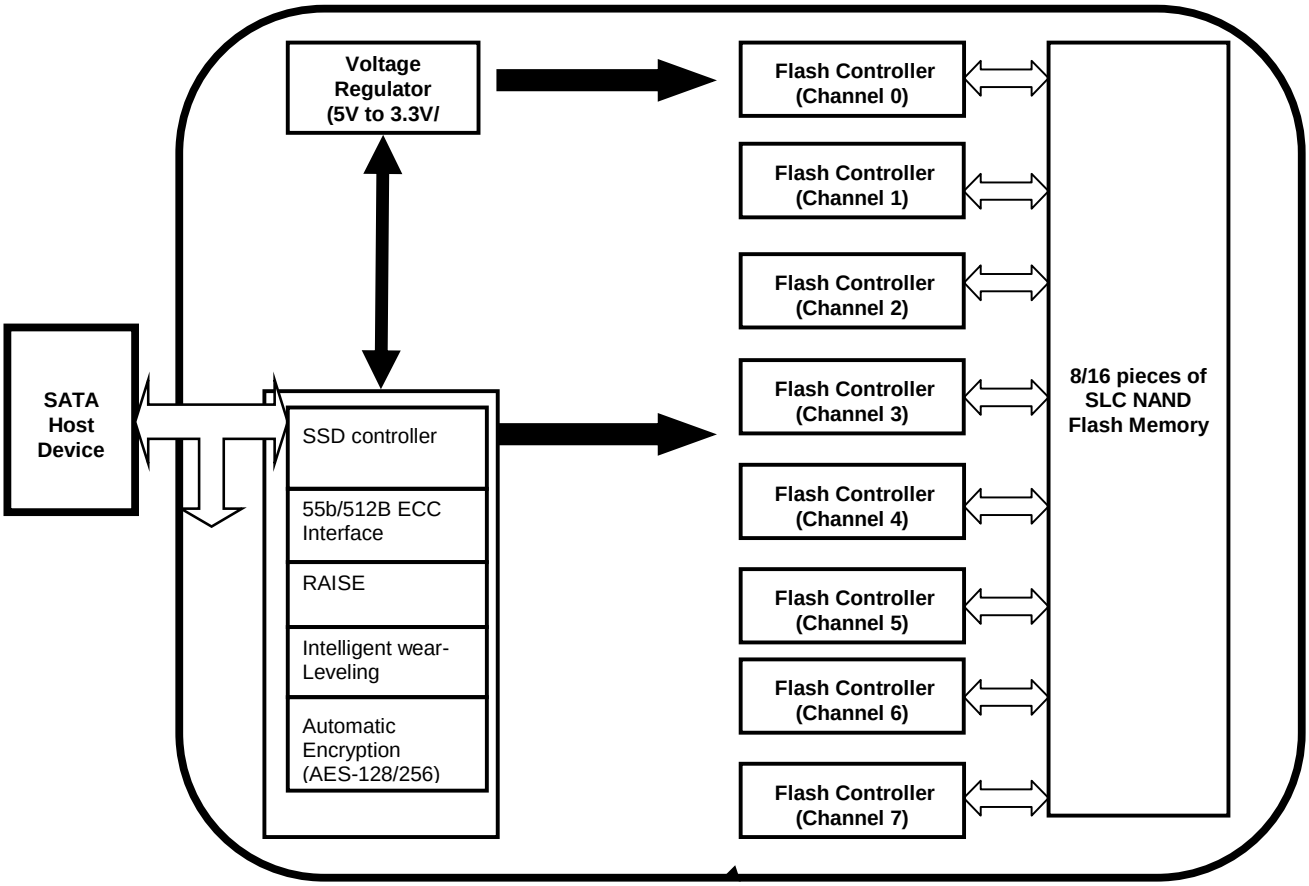
ATP Velocity SI Pro 2.5” SSD is a best-in-class wide-temp industrial grade SLC SSD solution with enterprise-class features. SI Pro SSD offers outstanding performance and proven reliability, ideal for extreme performance, high data security (AES 128/256 encryption), and consistent data integrity requirement (ATP PowerProtector technology), suited for POS, industrial computers, data center and industrial applications exposed to mission critical, high shock and vibration environments.

Main Feature

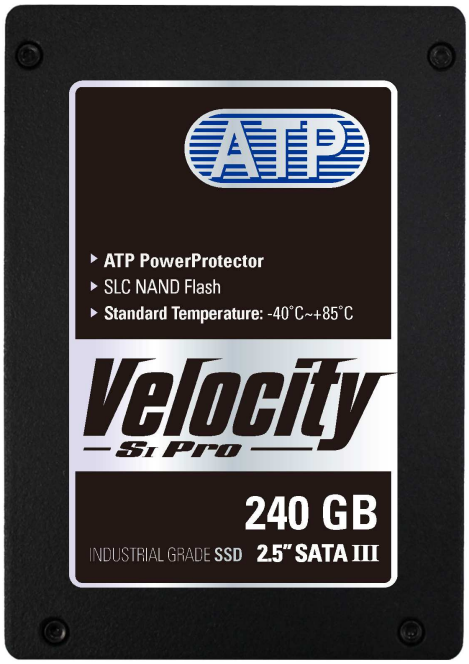
- SSD Processor with enterprise-class features for cost-sensitive client environment
- Capacities: 240GB/120GB/60GB/30GB
- SLC (Single Level Cell) NAND flash memory
- Maximum performance: Sequential read up to 500MB/s, sequential write up to 500MB/s (Without external SDRAM buffer memory)
- Random Read IOPS up to 60K, sustain write IOPS up to 20K
- ATP PowerProtector technology
- ATP secure erase
- ATP SSD life monitor
- RAISE provides RAID-like protection for single SSD client systems
- Operating temperature: -40^{o}C to +85^{o}C
- 6Gb/s SATA V3.0 compliant and backward compatible with SATA 3.0/1.5 Gb/s with NCQ/TRIM
- RoHS compliant
- CE , FCC & VCCI certification

Block Diagram

ATP SI Pro 2.5” SATA SSD consists of below functional blocks.
The advanced architecture is optimized to provide highest data reliability and transfer performance.



Product Images



AF240GSSCJ-MAAXP

Capacities

ATP P/N	ATP EXTERNAL P/N	CAPACITY	PowerProtector
AF30GSSCJ-MAAXP	AF30GSSCJ-MAAXP	30GB	Yes
AF60GSSCJ-MAAXP	AF60GSSCJ-MAAXP	60GB	Yes
AF120GSSCJ-MAAXP	AF120GSSCJ-MAAXP	120GB	Yes
AF240GSSCJ-MAAXP	AF240GSSCJ-MAAXP	240GB	Yes

Notes:

1. 1 GB = 1,000,000,000 Byte

SATA SSD Pin Assignment

Group	Pin No.[1]	Function	Description
Signal Segment	S1	GND	Ground
	S2	A+	Differential signal pair A
	S3	A-	
	S4	GND	Ground
	S5	B-	Differential signal pair B
	S6	B+	
	S7	GND	Ground
Key & Spacing			
Power Segment	P1	NC/V_{33}	3.3V power (Not used)
	P2	NC/V_{33}	3.3V power (Not used)
	P3	NC/V_{33}	3.3V power (Not used)
	P4	GND	Ground
	P5	GND	Ground
	P6	GND	Ground
	P7	V_5	5V power, pre-charge
	P8	V_5	5V power
	P9	V_5	5V power
	P10	GND	Ground
	P11	NC/DAS	Not used
	P12	GND	Ground
	P13	NC/V_{12}	12V power (Not used)
	P14	NC/V_{12}	12V power (Not used)
	P15	NC/V_{12}	12V power (Not used)

Notes:

1. All pins are in a single row, with a 1.27 mm (0.050”) pitch.

System Power Requirement

Parameter	Symbol	Min	Type	Max	Unit	Remark
Supply voltage	V_{CC}	4.5	5.0	5.5	V	
Active power	P_W	-	2.5	7	W	RMS value
Idle power	P_S	-	0.5	-	W	RMS value

Environment Specifications

Type		Value
Temperature	Operating	-40°C to 85°C
	Non-Operating	-45°C to 85°C
Humidity	Operating	25°C，8% to 95%, noncondensing
	Non-Operating	40°C，8% to 93%, noncondensing
Vibration	Operating	sine 16.4G, 10~2000Hz
Shock	Operating	Half sine 1500G/0.5ms
Altitude	Operating	80,000 feet Max.
	Non-Operating	80,000 feet Max.

Reliability

Type	Value
MTBF	2,000,000 hours

Notes:

1. The Mean Time Between Failures (MTBF) is calculated using a prediction methodology, Telcordia SR-332, which based on reliability data of the individual components in the SSD. It assumes nominal voltage, with all other parameters within specified range.

TBW (Total Bytes Written)

TBW (total bytes written) is an index of how many TB (Terabytes) can be used for written under product life time.
This value varies from SSD density

Type	Value (TB=Tera-Bytes, Decimal)
30GB	900TB
60GB	1800TB
120GB	3600TB
240GB	7200TB

Performance

Type	Value
Host Interface Speed	SATA 1.5Gb/s, 3.0Gb/s and 6.0Gb/s
Data Transfer Rate	Sequential Read: up to 500MB/s
	Sequential Write: up to 500MB/s
Random Read IOPS[1]	4KB Random Read: up to 60,000 IOPS

Notes:

1:IOPS: Input/Output Operations per Second

ATA Feature Set

Feature	Support
48-Bit Address feature set	YES
Advanced Power Management (APM) feature set	YES
General feature set	YES
General Purpose Logging (GPL) feature set	YES
Long Logical Sector (LLS) feature set non-512	YES
Native Command Queuing (NCQ) feature set	YES
Power Management feature set	YES
Power-Up In Standby (PUIS) feature set	YES
Security feature set	YES
S.M.A.R.T. feature set	YES
Software Settings Preservation (SSP) feature set	YES
Write-Read-Verify feature set	YES

ATA Command Set

Command	OpCode
NOP	00h
DATA SET MANAGEMENT	06h
RECALIBRATE	10h
READ SECTORS	20h
READ SECTORS WITHOUT RETRY	21h
READ LONG	22h
READ LONG WITHOUT RETRY	23h
READ SECTOR(S) EXT	24h
READ DMA EXT	25h
READ NATIVE MAX ADDRESS EXT	27h
READ MULTIPLE EXT	29h
READ LOG EXT	2Fh
WRITE SECTORS	30h
WRITE SECTORS WITHOUT RETRY	31h
WRITE LONG	32h
WRITE LONG WITHOUT RETRY	33h
WRITE SECTORS(S) EXT	34h
WRITE DMA EXT	35h
SET MAX ADDRESS EXT	37h
WRITE MULTIPLE EXT	39h
WRITE DMA FUA EXT	3Dh
WRITE LOG EXT	3Fh
READ VERIFY SECTOR(S)	40h
READ VERIFY SECTOR(S) (without Retry)	41h
READ VERIFY SECTOR(S) EXT	42h
WRITE UNCORRECTABLE EXT	45h
READ LOG DMA EXT	47h
WRITE LOG DMA EXT	57h
READ FPDMA QUEUED	60h
WRITE FPDMA QUEUED	61h
SEEK	70h
EXECUTE DEVICE DIAGNOTIC	90h

Command	OpCode
INITIALIZE DEVICE PARAMETERS	91h
DOWNLOAD MICROCODE	92h
DOWNLOAD MICROCODE DMA	93h
SMART	B0h
READ MULTIPLE	C4h
WRITE MULTIPLE	C5h
SET MULTIPLE MODE	C6h
READ DMA	C8h
READ DMA WITHOUT RETRIES	C9h
WRITE DMA	CAh
WRITE DMA WITHOUT RETRIES	CBh
WRITE MULTIPLE FUA EXT	CEh
STANDBY IMMEDIATE	E0h
IDLE IMMEDIATE	E1h
STANDBY	E2h
IDLE	E3h
READ BUFFER	E4h
CHECK POWER MODE	E5h
SLEEP	E6h
FLUSH CASH	E7h
WRITE BUFFER	E8h
READ BUFFER DMA	E9h
FLUSH CACHE EXT	EAh
WRITE BUFFER DMA	EBh
IDENTIFY DEVICE	ECh
SET FEATURES	EFh
SECURITY SET PASSWORD	F1h
SECURITY UNLOCK	F2h
SECURITY ERASE PREPARE	F3h
SECURITY ERASE UNIT	F4h
SECURITY FREEZE LOCK	F5h
SECURITY DISABLE PASSWORD	F6h
READ NATIVE MAX ADDRESS	F8h
SET MAX ADDRESS	F9h

Power Management Support

ATA Power Modes

- ACTIVE
- IDLE
- STANDBY
- SLEEP

SATA Link Power States

- ACTIVE – PHY Ready, full power, Tx & Rx operational
- PARTIAL – Reduced power, resumes in under 10 usec
- SLUMBER – Reduced power, resumes in under 10 msec
- HIPM – Host-Initiated Power Management
- DIPM – Device-Initiated Power Management
- AUTO-SLUMBER – Automatically transition to partial slumber

SMART Command Set

Command	Value (Hex)
Reserved	00-CF
SMART read attributes	D0
SMART enable/disable attribute autosave	D2
SMART execute off-line immediate	D4
SMART read log sector	D5
SMART write log sector	D6
SMART enable operations	D8
SMART disable operations	D9
SMART return status	DA
Reserved (Vendor Specific)	DC-FF

SMART Attribute

ID	Value (Hex)	Attribute Name
1	0x01	Raw Read Error Rate
5	0x05	Retired RBlock Count
9	0x09	Power-On Hours (POH)
13	0x0C	Device Power Cycle Count
171	0xAB	Program Fail Count
172	0xAC	Erase Fail Count
174	0xAE	Unexpected Power Loss Count
177	0xB1	Wear Range Delta
181	0xB5	Program Fail Count
182	0xB6	Erase Fail Count
187	0xBB	Reported Uncorrectable Errors
194	0xC2	Temperature
195	0xC3	On-the-Fly ECC Uncorrectable Error Count
196	0xC4	Reallocation Event Count
201	0xC9	Uncorrectable Soft Read Error Rate
204	0xCC	Soft ECC Correction Rate
230	0xE6	Drive Life Protection Status
231	0xE7	SSD Life Left
241	0xF1	Lifetime Writes from Host
242	0xF2	Lifetime reads from Host

Physical Dimension Specifications

Type	Value
Form factor	2.5”
Length	100 mm +/- 0.25mm
Width	69.85 mm +/- 0.25mm
Thickness	9.5 mm +/- 0.25mm

Mechanical Form Factor (Units in mm)

Standard Profile Mechanicals: