Apacer

INDUSTRIAL

SECURE

Apacer
Access the best

THE MOST **RELIABLE**
STORAGE FOR INDUSTRIES

GLOBAL PRESENCE

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PRODUCT GUIDE

Industrial SSD
S O L U T I O N S

DOC : 20120606

Index

High Performance

Low Power Consumption

Increased Security

High Reliability

Why Apacer SSD?

Quality Assurance

Apacer insists on the highest quality of SSD products, which have undergone extensive reliability testing (temperature, humidity, vibration, and shock tests etc.) and ORT (on-going reliability test) testing to ensure the stability and lifespan of products in mass production.

Professional Technique

Apacer R&D team has innovative R&D capability, technologies for storage firmware, hardware, and customizability, all of which have contributed to many leading products in the industry.

TAIWAN EXCELLENCE 2011

TAIWAN EXCELLENCE 2010

Remarkable Achievement

With more than ten years' commitment to SSD industry, Apacer is the most professional Taiwan-based industrial SSD manufacturer trusted by Tier 1 PC giants in the U.S. and Japan for a long time, with shipment volume over 30 million units.

Longevity Commitment

Apacer guarantees to provide stable availability after clients' product verification. In addition to avoiding out of stock risk, compatibility problems are also significantly reduced, helping the clients reduce the time and cost for repeated verifications.

Extensive Experience

Apacer has rich industry experience, so the product compatibility and customization service meet the harsh requirements of clients, which help Apacer outstand among many competitors and gain clients' long term support and trust.

Reliable Service

Apacer offers the manufacturing equipments and processes in compliance with the quality management criteria of international giants, along with real-time post-sale service system and return/replacement service, etc. We insist on "access the best" as the core competence of the products and thus become the clients' most trustworthy partner.
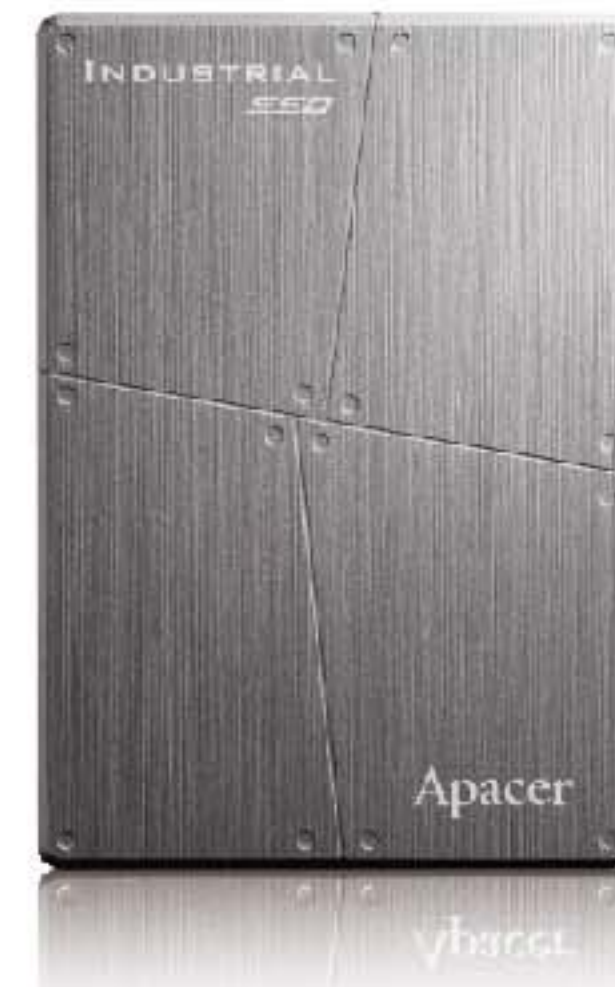
Apacer

SAFD
Serial ATA Flash Drive

Features

- Perfect replacement of 2.5" SATA HDDs
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Trim command support
- MLC extended temperature support (Optional)
- High IOPs performance for enterprise servers or networking systems

Specifications

Model	SAFD 25P	SAFD 25P-M	SAFD 25A	SAFD 25A-M
Interface	SATA 3Gb/s		SATA 6Gb/s	
Connector	(7+15) pin male		(7+15) pin male	
Physical Form Factor (Inch)	2.5		2.5	
Flash Type	SLC	MLC	SLC	MLC
Capacity	32GB~256GB	16GB~512GB	32GB~256GB	32GB~512GB
Max. R/W Performance (MB/sec)	265/230	260/220	TBD	Est. 475/360
IOPs (4K Random Write)	12K	10K	TBD	Est. 50K
ECC Support	16 or 24 bit/ 1K Bytes		40 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70		0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*	-	-
Storage Temp. (°C)	-40~+100		-40~+100	
Shock	1500G		1500G	
Vibration	15G		15G	
Humidity	5%~95%		5%~95%	
MTBF (hours)	>2,000,000	>1,000,000	>2,000,000	>1,000,000
Dimensions (mm)	100(L) x 69.8(W) x 9.3(T)		100(L) x 69.8(W) x 9.3(T)	

* = Supports 32GB~256GB

SAFD
Serial ATA Flash Drive

Features

- Perfect replacement of 2.5" SATA HDDs
- Half size of a 2.5" SSD and light weight
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)

Specifications

Model	SAFD 25M4	SAFD 25M4-M
Interface	SATA 3Gb/s	
Connector	(7+15) pin male	
Physical Form Factor (Inch)	2.5	
Flash Type	SLC	MLC
Capacity	4GB~64GB	8GB~128GB
Max. R/W Performance (MB/sec)	165/150	155/80
ECC Support	16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	48.7(L) x 69.8(W) x 9.3(T)	

* = Supports 16GB~64GB

SAFD
Serial ATA Flash Drive

SAFD
Serial ATA Flash Drive

Features

- Perfect replacement of 1.8" SATA HDDs
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)

Features

- Compliant with JEDEC MO-297 standard
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)

Specifications

Model	SAFD 18P	SAFD 18P-M
Interface	SATA 3Gb/s	
Connector	(7+9) pin male	
Physical Form Factor (Inch)	1.8"	
Flash Type	SLC	MLC
Capacity	8GB~128GB	16GB~256GB
Max. R/W Performance (MB/sec)	260/215	250/165
ECC Support	16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	78.3(L) x 54(W) x 5(T)	

* = Supports 16GB~128GB

Specifications

Model	SAFD 18S4	SAFD 18S4-M
Interface	SATA 3Gb/s	
Connector	(7+15) pin male	
Physical Form Factor (Inch)	1.8"	
Flash Type	SLC	MLC
Capacity	4GB~64GB	8GB~128GB
Max. R/W Performance (MB/sec)	165/150	155/80
ECC Support	16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	54(L) x 39.58(W) x 4(T)	

* = Supports 16GB~64GB

mSATA

Features

- mSATA connector and mini PCIe form factor
- Compliant with JEDEC MO-300 standard
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)
- Intel® Rapid Start and Intel® Smart Response support (Only for A1 & A1-M)
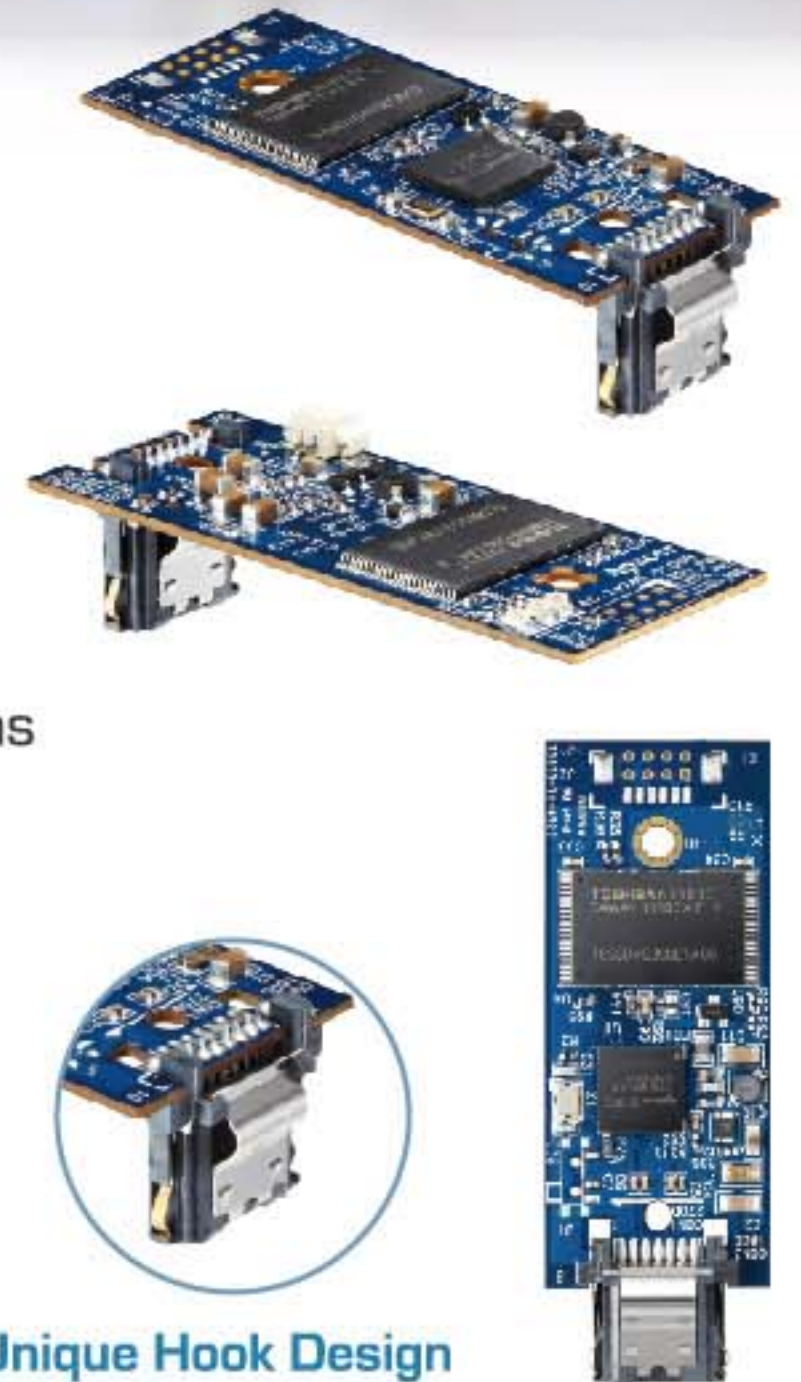
Specifications

Model	M4	M4-M	A1 (Coming Soon)	A1-M	L1 (Coming Soon)	L1-M
Form Factor	Mini PCIe					
Interface	SATA 3Gb/s		SATA 6Gb/s		SATA 6Gb/s	
Flash Type	SLC	MLC	SLC	MLC	SLC	MLC
Capacity	4GB~64GB	8GB~128GB	32GB~128GB	32GB~256GB	32GB~128GB	32GB~256GB
Max. R/W Performance (MB/sec)	165/150	155/80	TBD	Est. 470/200	TBD	Est. 470/200
ECC Support	16 or 24 bit/ 1K Bytes		40 bit/ 1K Bytes		40 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70		0~+70		0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*	-	-	-40~+85	-
Storage Temp. (°C)	-40~+100		-40~+100		-40~+100	
Shock	50G		50G		50G	
Vibration	15G		15G		15G	
Humidity	5%~95%		5%~95%		5%~95%	
MTBF (hours)	>2,000,000	>1,000,000	>2,000,000	>1,000,000	>2,000,000	>1,000,000
Dimensions (mm)	50.8(L) x 29.85(W) x 6(T)		50.8(L) x 29.85(W) x 6(T)		50.8(L) x 29.85(W) x 6(T)	
Features	MLC extended temp. support		High IOPs (4K Random Write): 30K		Low power consumption: 10mA (Idle Mode)	

* = Supports 16GB ~ 64GB
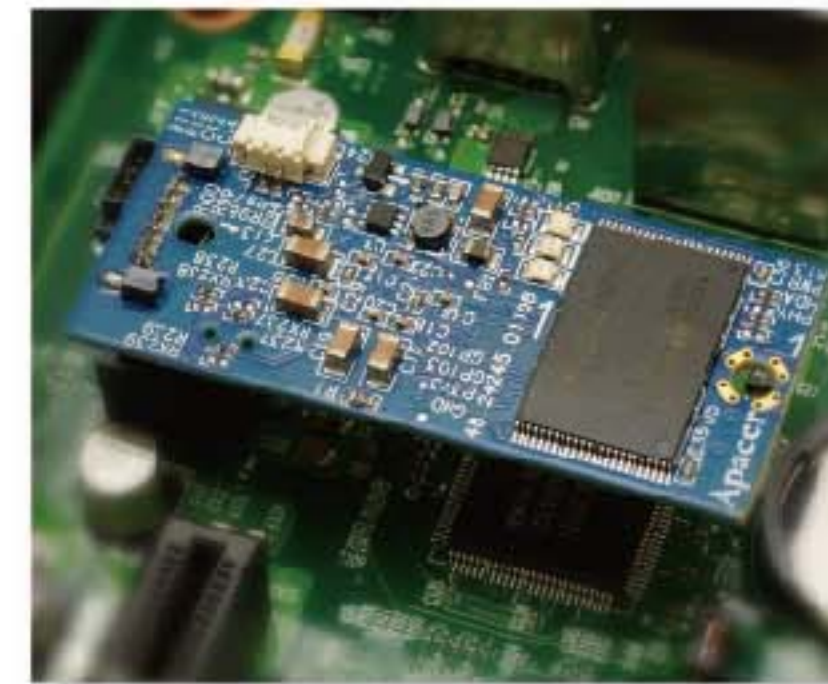
SDM

SATA Disk Module

Features

- 7-pin SATA connector
- Power cable-less solution
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)

Unique Hook Design

Specifications

Model	SDM4 Slim & SH (Coming Soon)	SDM4-M Slim & SH (Coming Soon)	SDM4 Middle Profile	SDM4-M Middle Profile
Connector	7-pin			
Product Type	180D		90D/180D/270D	
Interface	SATA 3Gb/s		SATA 3Gb/s	
Flash Type	SLC	MLC	SLC	MLC
Capacity	1GB~16GB	4GB~32GB	2GB~32GB	4GB~64GB
Max. R/W Performance (MB/sec)	43/42	43/21	85/50	80/43
ECC Support	16 or 24 bit/ 1K Bytes		16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~70		0~70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100		-40~+100	
Shock	50G		50G	
Vibration	15G		15G	
Humidity	5%~95%		5%~95%	
MTBF (hours)	>2,000,000	>1,000,000	>2,000,000	>1,000,000
Product Image/ Dimensions (mm)	180D Slim: 35.9(L) x 16(W) x 6.45(T)	180D SH: 37.35(L) x 19(W) x 6.90(T)	90D: 35.9(L) x 16(W) x 6.45(T)　180D: 87.9(L) x 24(W) x 8.95(T)　270D: 58(L) x 24(W) x 17.1(T)	

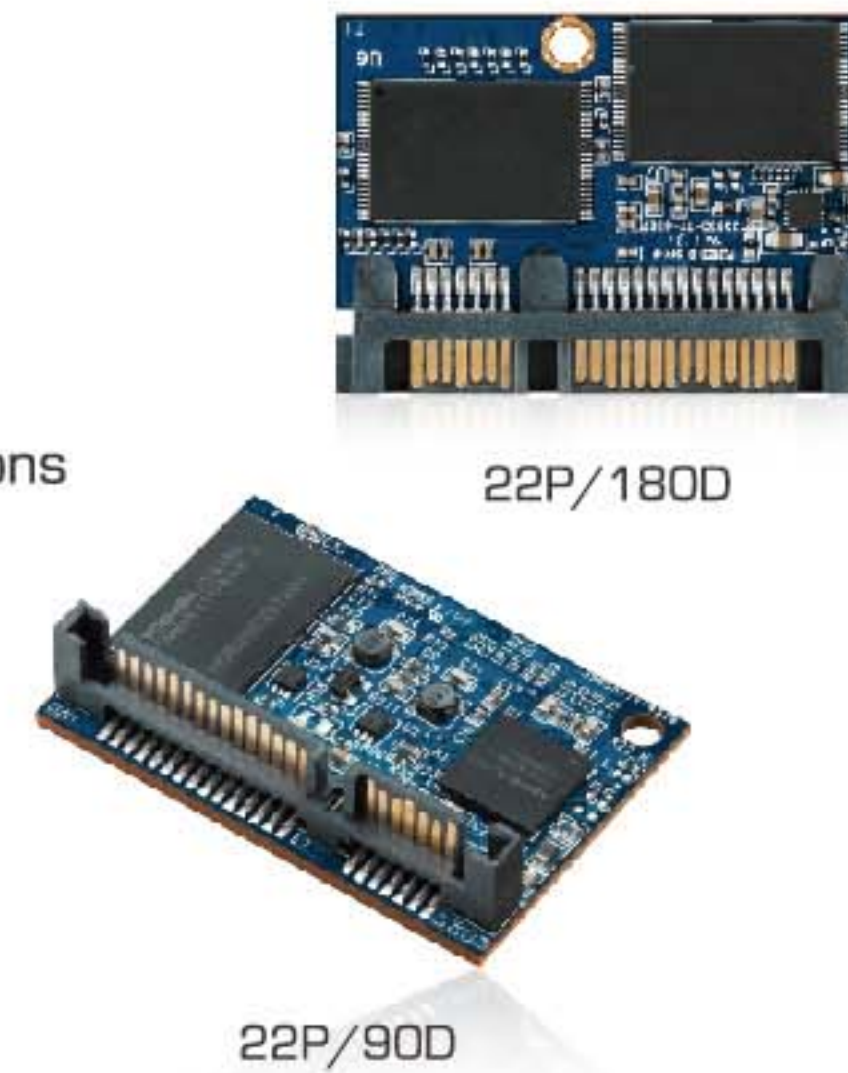* = Supports 4GB ~ 16GB　　　　　　* = Supports to 8GB ~ 32GB

SDM
SATA Disk Module

Features

- 22-pin SATA connector
- Power pin inside
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)

22P/180D

22P/90D

Specifications

Model	SDM4	SDM4-M
Connector	22-pin	
Product Type	90D/180D	
Interface	SATA 3Gb/s	
Flash Type	SLC	MLC
Capacity	2GB~64GB	4GB~128GB
Max. R/W Performance (MB/sec)	165/150	155/80
ECC Support	16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	**90D:** 44(L) x 30(W) x 11(T) , **180D:** 45.8(L) x 32.8(W) x 5.73(T)	

* = Supports 8GB ~ 64GB

SDM
SATA Disk Module

Features

- 7-pin SATA connector
- Power cable-less solution
- Global wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent Power Failure Recovery
- Trim command support
- MLC extended temperature support (Optional)
- Product housing selection (Optional)
- Perfect solution for 1U server system

32.5 mm

TAIWAN EXCELLENCE 2010

29.4 mm

GND (GROUND SIDE)

Power Source

Unique Hook Design

Specifications

Coming Soon

Model	SDM4 LPH	SDM4-M LPH	SDM4 LUH & RUH	SDM4-M LUH & RUH
Connector	7-pin			
Product Type	90D/180D		180D	
Interface	SATA 3Gb/s		SATA 3Gb/s	
Flash Type	SLC	MLC	SLC	MLC
Capacity	1GB~16GB	4GB~32GB	2GB~32GB	4GB~64GB
Max. R/W Performance (MB/sec)	43/42	43/21	85/50	80/43
ECC Support	16 or 24 bit/ 1K Bytes		16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~70		0~70	
Extended Op. Temp. (°C)	-40~+85	-40~+85*	-40~+85	-40~+85*
Storage Temp. (°C)	-40~+100		-40~+100	
Shock	50G		50G	
Vibration	15G		15G	
Humidity	5%~95%		5%~95%	
MTBF (hours)	>2,000,000	>1,000,000	>2,000,000	>1,000,000
Product Image/ Dimensions (mm)	**90D LPH:** 23.13(L) x 32.5(W) x 18.1(T)	**180D LPH:** 29.4(L) x 32.5(W) x 8.53(T)	**180D LUH:** 32.35(L) x 46(W) x 7.7(T)	**180D RUH:** 32.35(L) x 46(W) x 7.7(T)

* = Supports 4GB ~ 16GB   * = Supports 8GB ~ 32GB

SDC
SATA Disk Chip

ADC
ATA Disk Chip

AFD
ATA Flash Drive

Features

- SATA interface with 6mm in height for SDC
- 32-pin DIP IDE male connector for ADC
- Global wear-leveling and block management
- Built-in ATA secure erase S.M.A.R.T. * functions
  [* =S.M.A.R.T. function is only for SDC]
- Intelligent power failure recovery
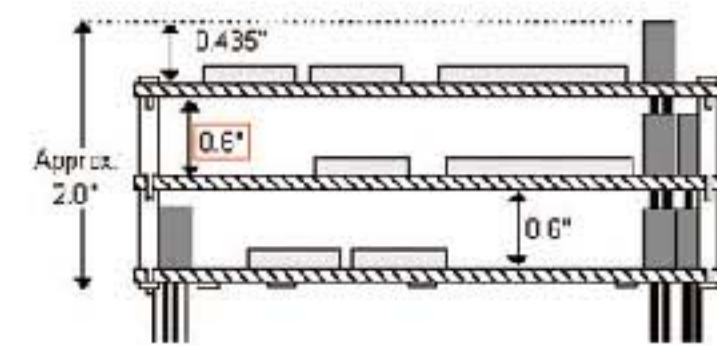- Ideal for PC/104 stackable application

18 pin

32 pin

Features

- Perfect replacement of 2.5" PATA HDDs
- Advanced wear-leveling and block management
- Built-ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- Trim command support
- Shock resistance, anti-vibration and low power consumption

Specifications

Model	SDC4	ADC 3G
Interface	SATA 3Gb/s	ATA
Connector	18/32 round pin DIP connector	600mil 32 round DIP connector
Flash Type	SLC	
Capacity	2GB~32GB	128MB~8GB
Transfer Mode	-	PIO Mode-4; MWDMA Mode-2; UDMA Mode-5
Max. R/W Performance (MB/sec)	85/80	55/40
ECC Support	16 or 24 bit/ 1K Bytes	24 bit/ 1K Bytes
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	
Dimensions (mm)	19.3[L]x42.6[W]x9.57[T]	

Application Scenario

A sketch of PC/104

0.435"
0.6"
Approx. 2.0"
0.6"

- Stackable Design
- Space concern
- Dimensions: 3.550 x 3.775 inch
- Only 0.6 inch (15.2mm [Height] between boards)
- Target: Industrial and Military Fields

ADC 3G
8GB   Apacer

Specifications

Coming Soon

Model	AFD 257	AFD 257-M
Interface	Standard ATA/IDE	
Connector	44– pin male	
Physical Form Factor (inch)	2.5"	
Flash Type	SLC	MLC
Capacity	32GB~256GB	64GB~256GB
Transfer Mode	PIO Mode-4, MWDMA Mode-2, UDMA Mode-6	
Max. R/W Performance (MB/sec)	120/110	120/90
ECC Support	72 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-
Storage Temp. (°C)	-40~+100	
Shock	1500G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	100[L] x 69.8[W] x 9.3[T]	

AFD
ATA Flash Drive

AFD
ATA Flash Drive

Features

- Perfect replacement of 1.8" PATA HDDs
- Advanced wear-leveling and block management
- Built-ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- Trim command support

Features

- Perfect replacement of 1.8" PATA HDDs
- The half size of a 1.8" SSD and light weight
- Advanced wear-leveling and block management
- Built-ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery

Specifications

Model	AFD 187	AFD 187-M
Interface	Standard ATA/ IDE	
Connector	ZIF 40-pin	
Physical Form Factor(inch)	1.8"	
Flash Type	SLC	MLC
Capacity	32GB~128GB	64GB~256GB
Transfer Mode	PIO Mode-4, MWDMA Mode-2, UDMA Mode-6	
Max. R/W Performance (MB/sec)	120/110	120/90
ECC Support	18 bit/ 512 Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	71[L] x 54[W] x 5[T]	

Specifications

Model	AFD 18M-M
Interface	Standard ATA/IDE
Connector	ZIF 40- pin
Physical Form Factor (inch)	1.8"
Flash Type	MLC
Capacity	4GB~64GB
Transfer Mode	PIO Mode-4, MWDMA Mode-2, UDMA Mode-6
Max. R/W Performance (MB/sec)	80/20
ECC Support	24 bit/ 1K Bytes
Standard Op. Temp. (°C)	0~+70
Extended Op. Temp. (°C)	-
Storage Temp. (°C)	-40~+100
Shock	50G
Vibration	15G
Humidity	5%~95%
MTBF (hours)	>1,000,000
Dimensions (mm)	32[L] x 54[W] x 4.4[T]

ΛDM

ATA Disk Module

Features

- Standard 40-pin/44-pin IDE female connector
- Advanced wear-leveling and block management
- Built-ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- Secure protection zone

40-pin Connector

An option of Pin#20 blocked for foolproof design

Specifications

Model	ADM4	ADM4-M
Connector	40-pin /44-pin	
Product Type	40P/180D , 44P/90D, 44P/180D, 44P/270D	
Interface	Standard ATA/ IDE	
Flash Type	SLC	MLC
Capacity	1GB~16GB	2GB~64GB
Transfer Mode	PIO Mode-4, MWDMA Mode-2, UDMA Mode-6	
Max. R/W Performance (MB/sec)	85/40	75/24
ECC Support	12 bit/512 Bytes or 24 bit/1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40 ~+85	-
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Product Image/Dimensions (mm)	40P/180D 33.4(L)x51.4(W)x8.3(T) 44P/90D 28(L)x45(W)x6.65(T)	44P/180D 30.2(L)x44(W)x5(T) 44P/270D 32.6(L)x45(W)x6.8(T)

Industrial CF

Industrial Compact Flash

Features

- Compliant with CFA 4.1 specification
- Advanced wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- MLC extended temperature support
- Lock switch design for write-protection (CFC5 VA-only)

HW write-protect switch

Specifications

Model	CFC 5-STD	CFC 5-VA	CompactFlash 5
Connector	50-pin		
Interface	PC card memory mode, PC Card I/O mode, Tre IDE mode		
Flash Type	SLC	SLC	MLC
Capacity	128MB~64GB	128MB~64GB	4GB~64GB
Transfer Mode	PIO Mode-6, MWDMA Mode-4, UDMA Mode-5		PIO Mode-6, MWDMA Mode-4, UDMA Mode-6
Max. R/W Performance (MB/sec)	50/30	50/30	75/45
ECC Support	24 bit/ 1K Bytes	24 bit/ 1K Bytes	28 bit/ 512 Bytes
Standard Op. Temp. (°C)	0~+70		
Extended Op. Temp. (°C)	-40~+85		-40~+85*
Storage Temp. (°C)	-40~+100		
Shock	50G		
Vibration	15G		
Humidity	5%~95%		
MTBF (hours)	>1,600,000		>1,000,000
Dimensions (mm)	36.4(L) x 42.8(W) x 3.3(T)		

* = Supports 8GB~32GB

CFast

CFast Card

Features

- Compliant with CFast 1.0 specification
- Advanced wear-leveling and block management
- Built-in ATA secure erase and S.M.A.R.T. functions
- Intelligent power failure recovery
- Trim Command Support

Specifications

Model	CFast	CFast -M
Interface	SATA 3Gb/s	
Connector	[7+17] pin male	
Flash Type	SLC	MLC
Capacity	4GB~64GB	4GB~64GB
Max. R/W Performance (MB/sec)	160/150	155/80
ECC Support	16 or 24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF (hours)	>2,000,000	>1,000,000
Dimensions (mm)	42.8(L) x 36.4(W) x 3.6(T)	

Industrial SD

Industrial SD Card

Features

- Compliant with SD 2.0 specification
- Supports SD mode and SPI mode
- Wear-leveling and block management
- Auto standby and sleep mode support

Specifications

Model	SD	SD-M
Card Specification	SD 2.0 Compliance	
Flash Type	SLC	MLC
Capacity	SD 256MB~2GB , SDHC 4GB~8GB	SDHC 4GB~32GB
Max. R/W Performance (MB/sec)	20/13	18/12
ECC Support	24 bit/ 1K Bytes	
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	
Storage Temp. (°C)	-40~+100	
Durability	50,000 mating cycles	
Bending	10N	
Torque	0.15Nm or +/-2.5 deg. (max.)	
Drop Test	1.5m free fall	
Humidity	25%~95%	
WP Switch Cycles	Min. 1,000 cycles	
Dimensions (mm)	32(L) x 24(W) x 2.1(T)	

Industrial microSD

Industrial microSD Card

Features

- Compliant with SD 3.0 specification
- SD-protocol compatible
- Supports SD SPI mode
- Global wear-leveling and block management
- Low power consumption

Specifications

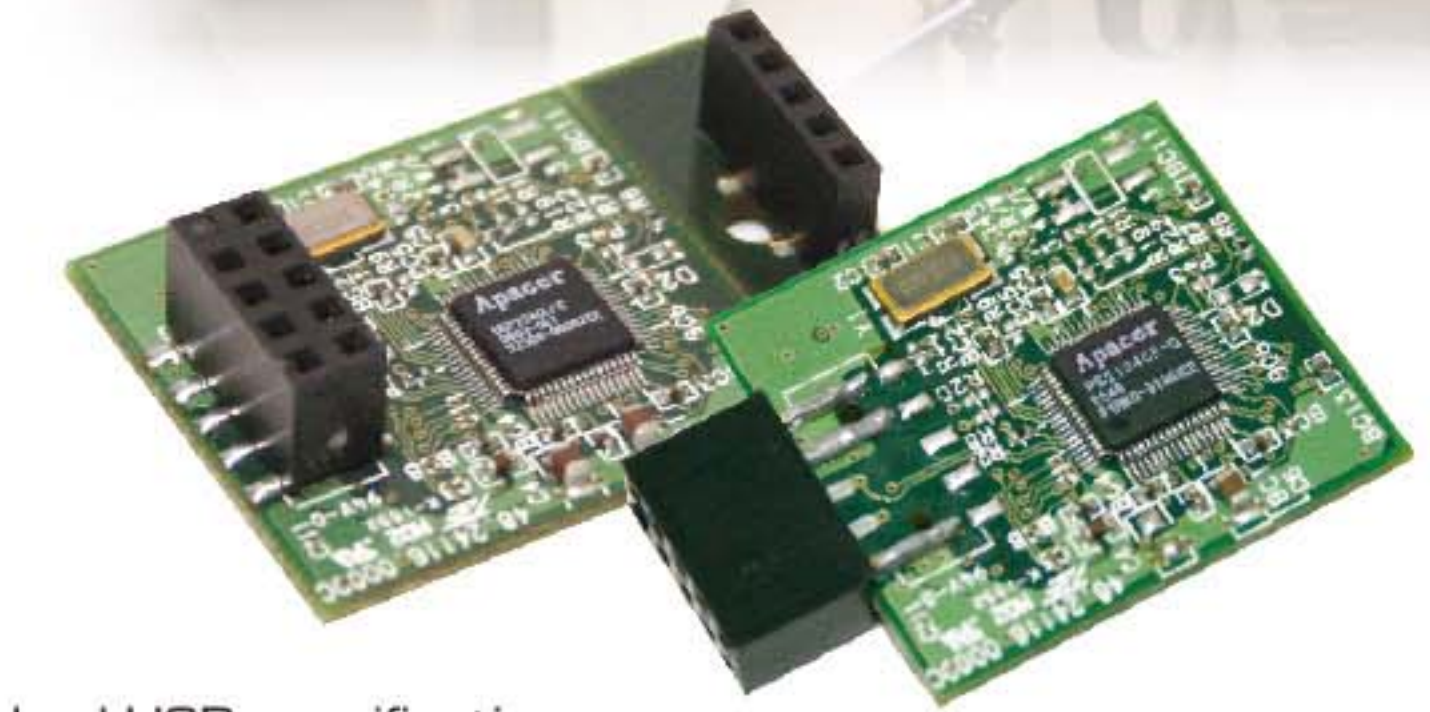| Model	MicroSD	MicroSDHC
Card Specification	SD 2.0 Compliance	SD 3.0 Compliance
Flash Type	SLC	MLC
Capacity	1GB~2GB	4GB~16GB
Max. R/W Performance (MB/sec)	19/14	20/14
ECC Support	24 bit/ 1K Bytes	Yes
Standard Op. Temp. (°C)	-25~+85	
Extended Op. Temp. (°C)	-40~+85	-
Storage Temp. (°C)	-40~+85	
Insertion/Removal Test	10,000	
Bending Test	10 nt/s times for 6 faces and 4 corners	
Humidity	40°C/93% RH 500hrs	
Salt-Spray	3+/1% NaCl ;35°C; 24 hrs	
Dimensions (mm)	11(L) x 15(W) x 1(T)	

UDM

USB Disk Module

Features

- Compliant with the standard USB specification
- Compact size and varies in dimensions
- Supports Linux/WinCE/WinXP Embedded/ Win7 Embedded
- Shock resistance, anti-vibration and low power consumption

Specifications

Model	UDMII Plus	UDMII Plus-M
Interface	USB 2.0	
Connector	10-pin (2x5 header)	
Connector Pintch(mm)	Type A, B, C, D: 2.54 & Type E: 2.00	
Flash Type	SLC	MLC
Capacity	256MB~8GB	4GB~64GB
Max. R/W Performance (MB/sec)	30/25	30/20
Standard Op. Temp. (°C)	0~+70	
Extended Op. Temp. (°C)	-40~+85	-
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
Product Image/Dimensions (mm)		

Type A
28.8 (L) X 26.65 (W) X 10.5 (T)

Type B
37.8 (L) X 26.65 (W) X 10.5 (T)

Type C
37.8 (L) X 26.65 (W) X 10.5 (T)

Type D
37.3 (L) X 26.65 (W) X 8.5 (T)

Type E
36.8 (L) X 26.5 (W) X 7.5 (T)

mPDM

mini PCIe Disk Module

Features

- Compliant with PCIe 2.0 standard
- Ultra-small form factor
- Plug-in-and-Play function
- Advanced Wear-Leveling and Block Management
- Intelligent power failure recovery

Secure SSD

- CoreDestroyer Technology
- CoreEraser Technology
  - Class 1: Quick Erase
  - Class 2: Full Erase
  - Class 3: MIL Erase
- CoreProtector Technology
  - Class 1: Data Protect
  - Class 2: Write Protect
  - Class 3: Device Protect

Specifications

Model	mPDM	mPDM-M
Form Factor	Mini PCI Express 2.0	
Interface	5Gb/sec	
Flash Type	SLC	MLC
Capacity	4GB~128GB	8GB~128GB
Max. R/W Performance (MB/sec)	300/200	300/60
Standard Op. Temp. (°C)	0~+70	
Storage Temp. (°C)	-40~+100	
Shock	50G	
Vibration	15G	
Humidity	5%~95%	
MTBF	>2,000,000	>1,000,000
Dimensions (mm)	50.8(L) x 29.85(W) x 6(T)	

Secure SSD Chart

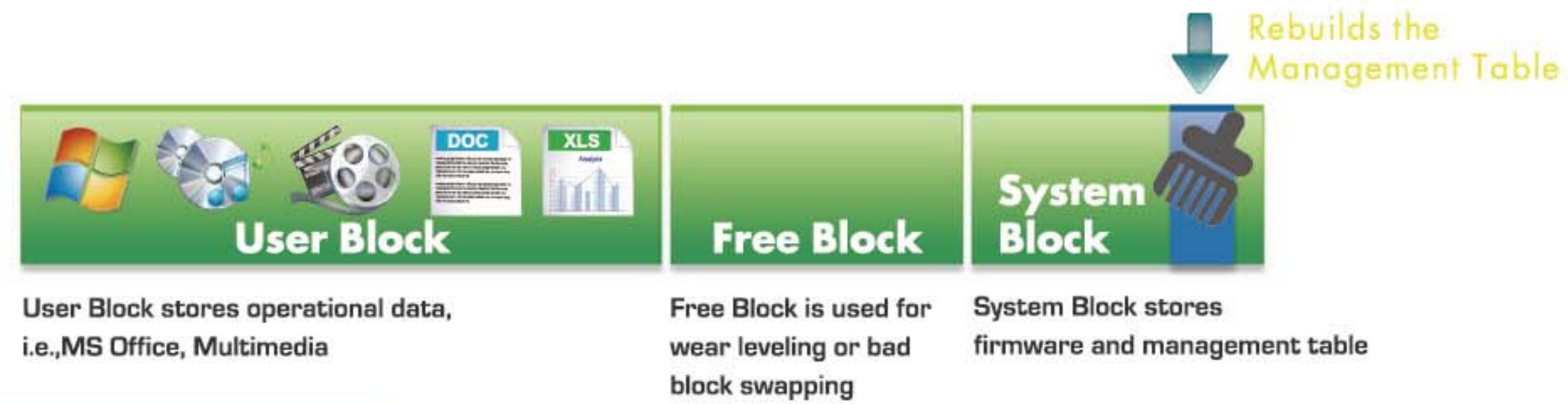| Interface	Model	CoreEraser			CoreDestroyer	CoreProtector		
		Class 1: Quick Erase	Class 2: Full Erase	Class 3: MIL Erase		Class 1: Data Protect	Class 2: Write Protect	Class 3: Device Protect
SATA SSD Series	SAFD25P/-M	●	●	●	●	★	●	●
	SAFD18P/-M	●	●	●	●	★	●	●
	SAFD25M4/-M	●	●	●	●	★	●	●
	SAFD18S4/-M	●	●	●	●	★	●	●
	SDM4/-M	●	●	●	●	★	●	●
	mSATA M4/-M	●	●	●	●	★	●	●
	SDC4	●	●	●	●	★	●	●
PATA SSD Series	ADM III						●	
	ADM4/-M						●	
Flash Card Series	CFast	●	●	●	●	★	●	●
USB SSD Series	UDMII Plus/-M						●	

★ = Security Key

CoreEraser Technology

Apacer's CoreEraser Technology provides highly comprehensive drive sanitization measures, developed to securely and thoroughly erase data in operating blocks. The CoreEraser comes in three classes of block sanitizations and can be implemented through vendor software command or hardware architect.
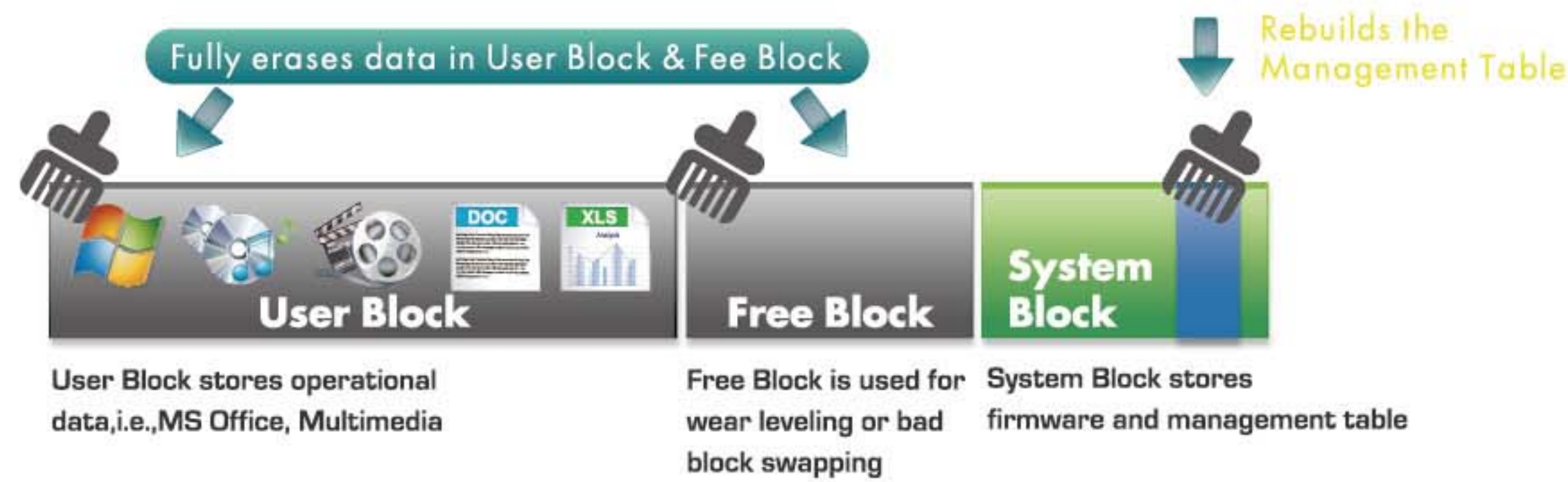
Class 1: Quick Erase

Quick Erase rebuilds the management table that serves as a data allocation and mapping link in the system block immediately after activation. Once the erase command is completed, all the erased data becomes irretraceable.

Rebuilds the Management Table

User Block | **Free Block** | **System Block**

User Block stores operational data, i.e.,MS Office, Multimedia

Free Block is used for wear leveling or bad block swapping

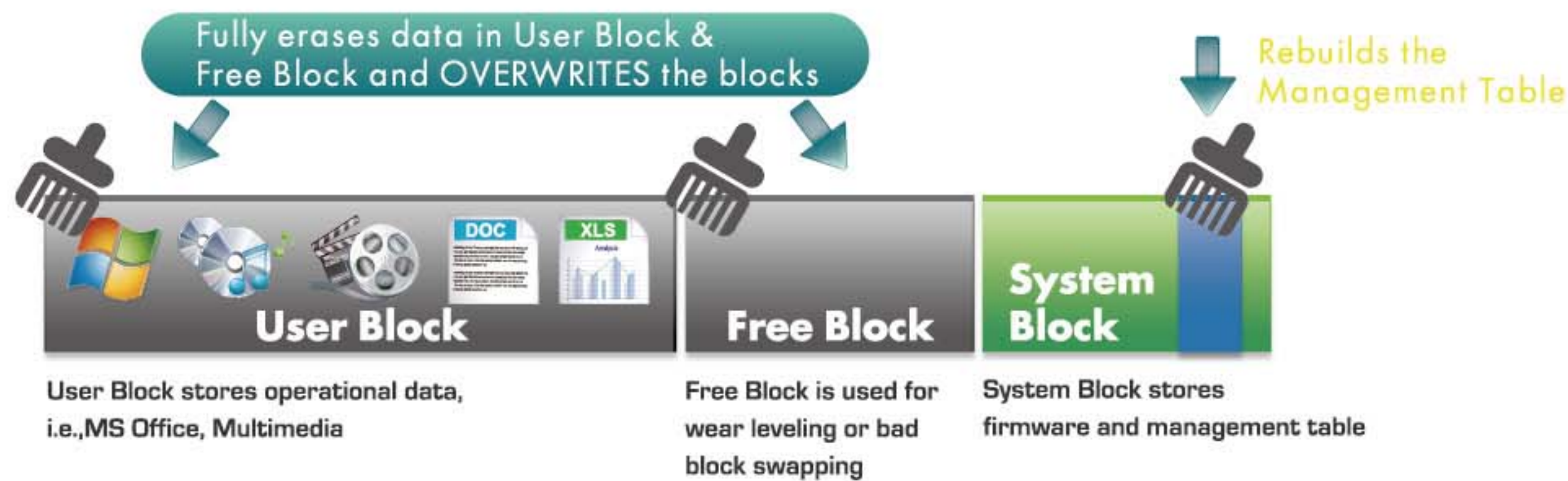System Block stores firmware and management table

Class 2: Full Erase

Functions as a more comprehensive Quick Erase, all contents of the user blocks and free blocks are erased, and the management table is rebuilt after the procedures are completed. Drive will be reinitialized upon the completion of the erase action. The device will practically act as a brand new drive as cells in the drive would display "FF" (or "00").

Fully erases data in User Block & Fee Block

Rebuilds the Management Table

User Block | **Free Block** | **System Block**

User Block stores operational data,i.e.,MS Office, Multimedia

Free Block is used for wear leveling or bad block swapping

System Block stores firmware and management table

Class 3: MIL Erase

MIL Erase includes a list of globally certified drive purge methods that meet the military and industrial standards, such as NSA 9-12. Most of them sanitize the user & free blocks by erasing the blocks, overwriting with random data and rebuilds the management table. These certified erase features are widely approved, providing confidence in secure data erasure.

Fully erases data in User Block & Free Block and OVERWRITES the blocks

Rebuilds the Management Table

User Block | **Free Block** | **System Block**

User Block stores operational data, i.e.,MS Office, Multimedia

Free Block is used for wear leveling or bad block swapping

System Block stores firmware and management table

CoreDestroyer Technology

The CoreDestroyer Technology practically terminates all the data in the drive, even the firmware and the management table. The drive would be unable to perform its functions. To bring the drive back to life, firmware reload is required.

All blocks in the drive are terminated

User Block | **Free Block** | **System Block**

User Block stores operational data, i.e.,MS Office, Multimedia

Free Block is used for wear leveling or bad block swapping

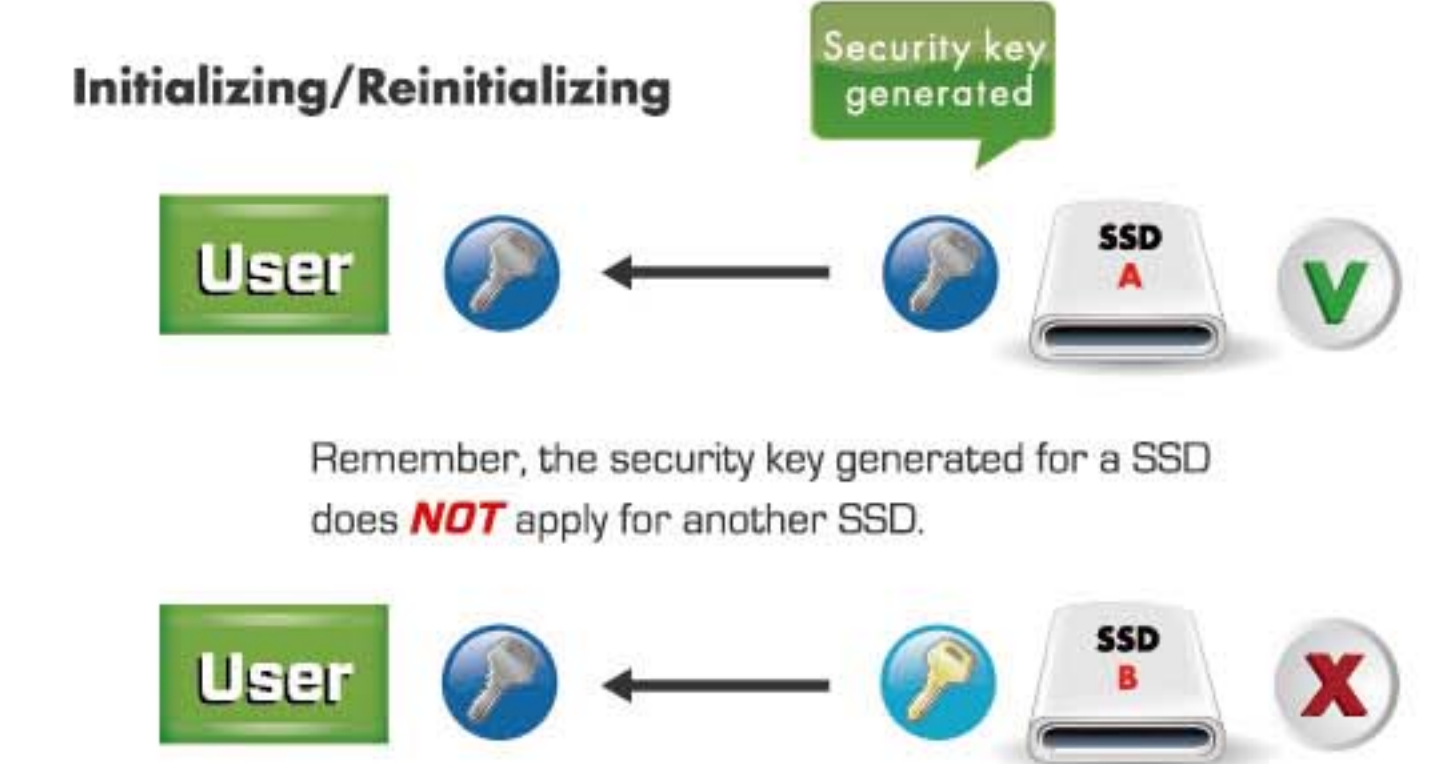System Block stores firmware and management table

CoreProtector

The widespread adoption of SSDs over HDDs in mission sensitive applications may attract potential data theft. In order to reinforce data security, Apacer introduces the CoreProtector technology that integrates multiple layers of protection for your valuable data.
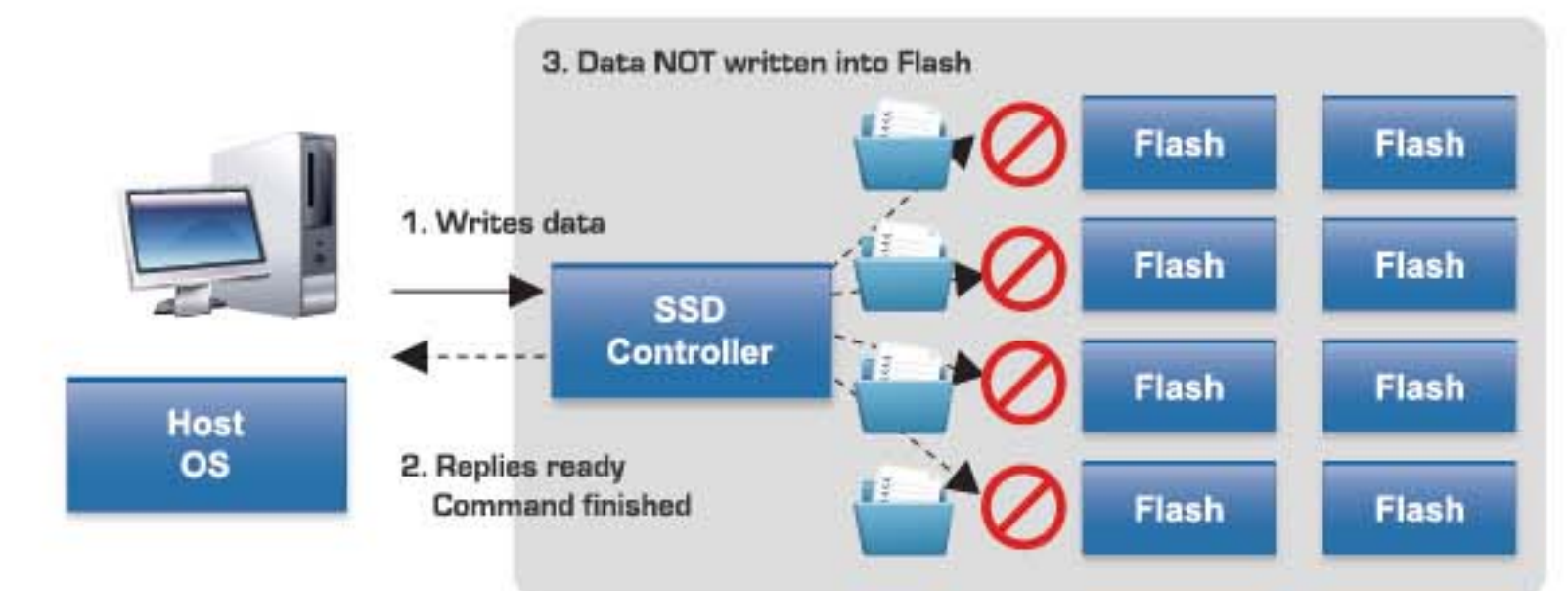
Class 1: Data Protect

To protect your data from being retrieved by unauthorized individuals, Apacer products come with a uniqne Security Key, activated whenever the SSD is booted. The key serves as password authorization. Each time the device is put in operation, a prior key verification will take place. The host must obtain the key that matches the one previously set and stored in the SSD. Failure to match the key will result in aborted operation.

Initializing/Reinitializing

Security key generated

User

SSD A

Remember, the security key generated for a SSD does **NOT** apply for another SSD.

User

SSD B

Class 2: Write Protect

Flash non-volatile storage devices like SSDs are widely used as operating system boot drive in mission intensive applications. Protecting data from unauthorized access has become critical. Apacer implements the Virtual Write scheme that allows write commands to go through the flash controller and data temporarily stored. The OS can then function normally but since the whole process is virtual, no data has been actually written into the flash. When the host system is reset or rebooted, all the temporarily stored data will be lost and nowhere to be found in the system. Since the Virtual Write scheme runs at device level, it requires no software or driver installation and is independent from the host OS.

3. Data NOT written into Flash

Host OS

1. Writes data

SSD Controller

2. Replies ready Command finished

Flash

Class 3: Device Protect

Developed as a more comprehensive security solution, Device protect can be considered as our Write Protect scheme integrated with read protection that prevents unauthorized accesses to read files in the device. When enabled, the Device Protect scheme would allow read commands to go through flash controller, but no actual data in the device can be read during the whole process. Without the proper way to disable the protection, unauthorized read attempts would receive only invalid data, indicated as "FFh" or "00h".

1. Reads data from SSD

Host OS

SSD Controller

2. Replies Invalid Data FFh

Flash
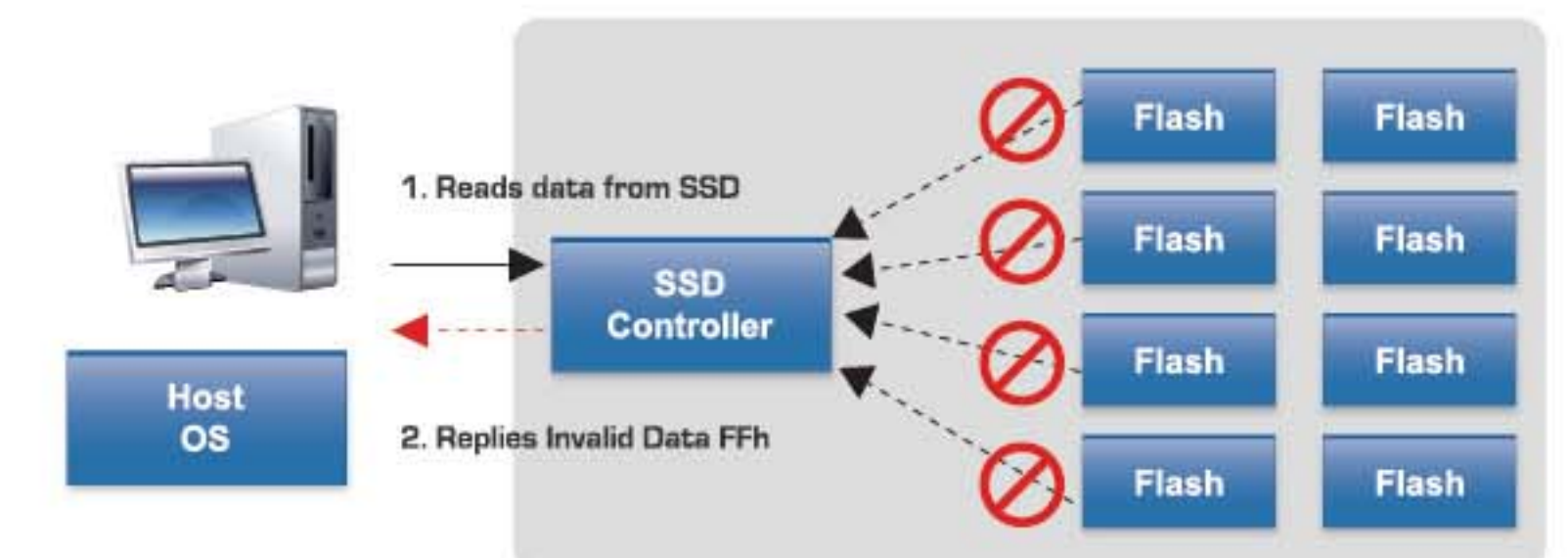
Boosts Apacer SSDs' reliability and stability

S.M.A.R.T.
Endurance and Sustainability

S.M.A.R.T is the abbreviation of Self-Monitoring, Analysis and Reporting Technology, an open standard enabling disk drives to automatically monitor health status and report with indicators of device conditions. This helps users to avoid data loss caused by unexpected device failure. Users may use the analytical data from S.M.A.R.T. to uncover hidden faults in device and prevent them from happening in future research and development reference.

Apacer devices use the standard S.M.A.R.T. command B0h to read data out from the drive to activate our S.M.A.R.T. feature that complies with the ATA/ATAPI-7 specifications. Based on the standard specifications, Apacer S.M.A.R.T. defines vendor-specific S.M.A.R.T. Attribute IDs (A0 ~ A5, and 0C). They represent Initial bad block count, Bad block count, Spare block count, Maximum erase count, Average erase count and Power cycle. When the Apacer S.M.A.R.T. Utility running on the host, it analyzes and reports the disk status to the host before the device reaches in critical condition.

Advantages

- Provides endurance analysis
- Instant maintenance & monitoring
- Lifetime status
- Maximize availability of user space

Apacer S.M.A.R.T. Utility

1) Task Bar
2) Drop-down menu for selecting SSD
3) SSD info: health
4) SSD general information
5) S.M.A.R.T. attributes: status of attributes including power cycle, erase count, block count, total sectors of write
6) Last-checked date

Power Failure Recovery
Ensure Data Integrity

Power Failure Recovery ensures data transmission when experiencing unstable power supply. Power disruption can occur when users are storing data into the SSD. In this urgent situation, the controller would enable the NAND Flash to run multiple write-to-flash cycles to securely store data. This urgent operation requires about several milliseconds to get it done so that the date transmission would be complete. At the next power up, the firmware will perform a status tracking to retrieve the mapping table and resume the previously programmed data to check if there is any incompleteness of data transmission.

The crucial part lies in the strength of the capacitor of the SSD. The capacitor must be able to hold up some milliseconds of remaining time before the power is totally out, for the urgent write-back-into-flash operations to complete.

Advantages

- Ensure data integrity
- Enhance availability on data retrieval
- Avoid data loss in critical time

Power Failure Test

Developed by Apacer for internal testing purpose, the Power Cycle Test is performed for measurement of all of Apacer e-Flash products on their abilities to recover information when facing intensive power on/off cycles.
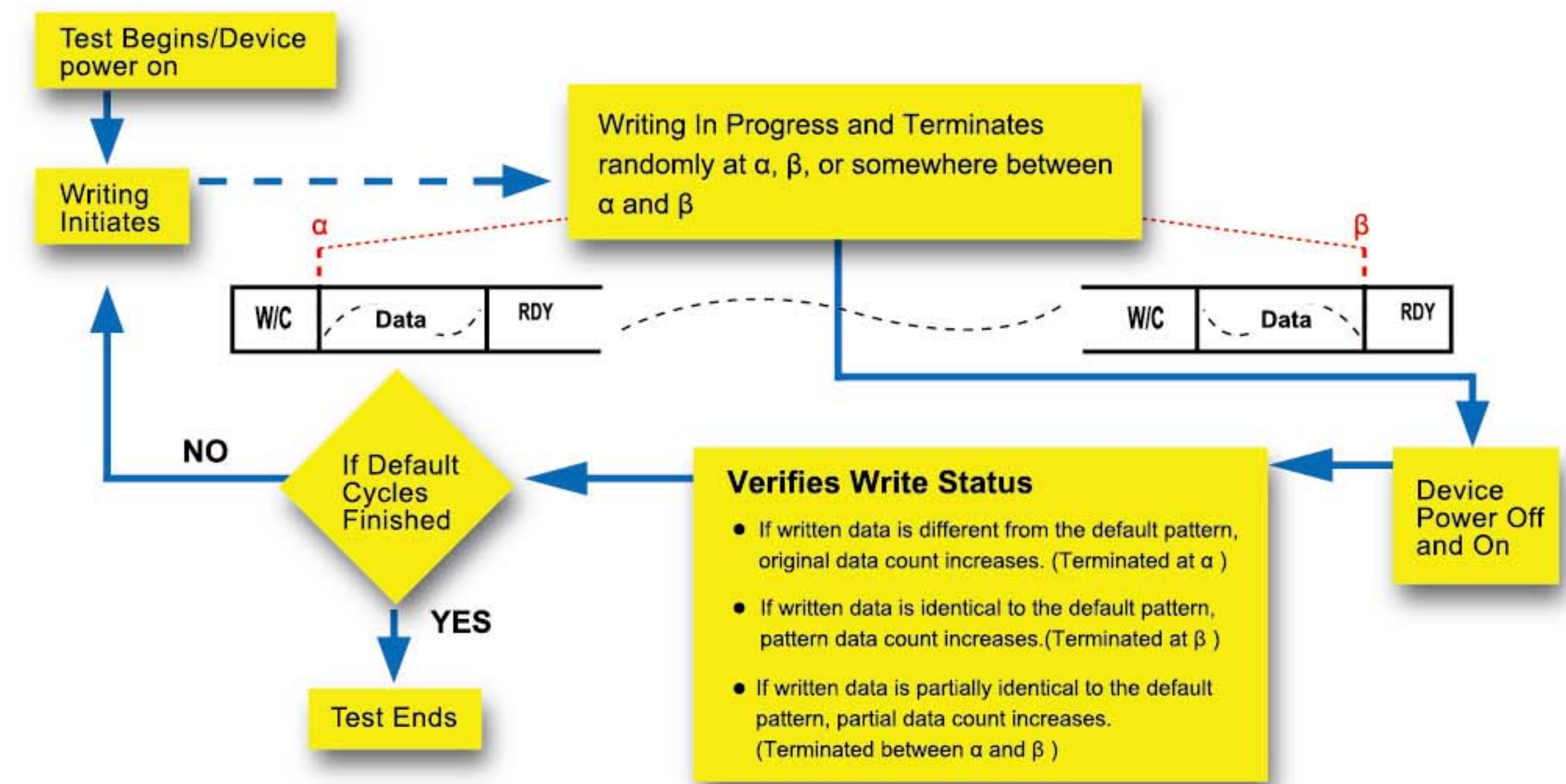
Legend:
W/C: Write Command
RDY: Ready

Flow Chart of Power Failure Test