



512GB(2259XT2 HYV7)

H001 512GB SATA3 Solid State Drive Datasheet

(Based on NAND Flash)

Version: 1.0

NOTE: INFORMATION IN THIS PRODUCT SPECIFICATION IS SUBJECT TO CHANGE AT ANYTIME WITHOUT NOTICE. ALL PRODUCT SPECIFICATIONS ARE PROVIDED FOR REFERENCE ONLY. TO ANY INTELLECTUAL PROPERTY RIGHTS IN A-Ray PRODUCT OR TECHNOLOGY. ALL INFORMATION IN THIS DOCUMENT IS PROVIDED.

Table of Contents

HOSINGLOBAL Technology Co.,LTD	
512GB	1
H001 512GB SATA3 Solid State Drive Datasheet	1
I. Introduction	3
1 Overview	3
2 Part Type Introduction	3
Outline	4
II. Block Diagram	5
IV. Product Specifications	6
4.1 Physical Dimensions	6
4.2 Interface Specification	6
4.2.1 Pin Assignment	6
4.2.2 Interface Mode	7
V. Reliability	7
5.1 ECC Descriptions	7
5.2 Advance Wear-Leveling Algorithm	8
5.3 S.M.A.R.T Function	8
VI. Ordering Information	8
VII. Related documentation	8
Attachment	8

I. Introduction

1 Overview

1 Overview

HG SATA SSD (Solid State Drive) is a high performance and high reliability storage device based on NAND Flash technology that designed to solve the bottleneck of computing system by traditional hard disk drives. Our SATA SSD doesn't have a moving parts and it has a same host interface and same physical dimension with Hard Disk Drive, so it can be drop-in replaced with the hard disk drives without anything. With a high performance and low power consumption, Our SATA SSD can be a good storage device for NB and Tabletop PC.

HG SATA SSD purely consists of semiconductor devices and NAND flash memories, which give rugged features against shock and vibration, used in extreme environment such as industrial PC to increase MTBF. Furthermore, Our SATA SSD has highly advanced flash memory management algorithm to guarantee

2 Part Type Introduction

This chapter is about the specifications of the 2.5" SATA Solid State Drive SSD with SATA III interface.

Type	Capacity	Flash	Interface
H001	512GB	3D TLC	SATAIII

Table 1 Capacity Specifications

Capacity	Available Capacity	R / W(MB/s)	Random R/W	IOPS
512GB	476.94GB	500/450	40921/65138	

Outline

Based spec	Interface	SATAIII
	Dimension	100*70*7 mm
	Weight ①	42~45g
	Capacity	512GB
	Controller	SMI2259XT2
	Flash type	3D TLC NAND Flash
Read/Write Performance ②	CDM Sequential Read	Up to 530MB/s
	CDM Sequential Write	Up to 490MB/s
	ATTO Sequential Read	Up to 530MB/s
	ATTO Sequential Write	Up to 490MB/s
Power Consumption	Power Supply	5V±5%
	Standby	0.3W
	Maximum Ripple	70 mV(peak to peak)
	4KB Random Write	2.5W
Reliability	TBW(endurance) :120TBW	
	Write endurance:3years @ 100G write/day	
	Read endurance: unlimited	
	MTBF: >1,000,000 hours	
	Data retention: >20years @ 25℃	
	Data destroy do not support	
	Sudden power-off recovery support	
	S.M.A.R.T,NCQ,Trim and dynamic power management support	
	Static and dynamic wear-leveling	
	Bad block management algorithm	
	ECC: LDPC ECC	
Environment	Storage temperature: -55~95 ℃	
	Operation temperature: 0~75℃	
	Humidity: 5%~95%	
	Vibration	15G (10 to 2000Hz)
	Shock	1500G at 0.5ms
Warranty	3 years	

Table 2 outline of the driver

①, ②: The Read/Write performance and weight vary with different capacity of products.

The testing environment is below:

OS: Windows 7 Ultimate

CPU: Intel (R) Core(TM) i3-2100T CPU @2.50GHz

Memory: 4GB

Motherboard: Controller:SMI2258XT,SATA III,512GB SSD

Test program: ATTO Disk BenchMark ; CrystalDiskMark
Test Drive: H001 512GB (3D TLC)

II. Block Diagram

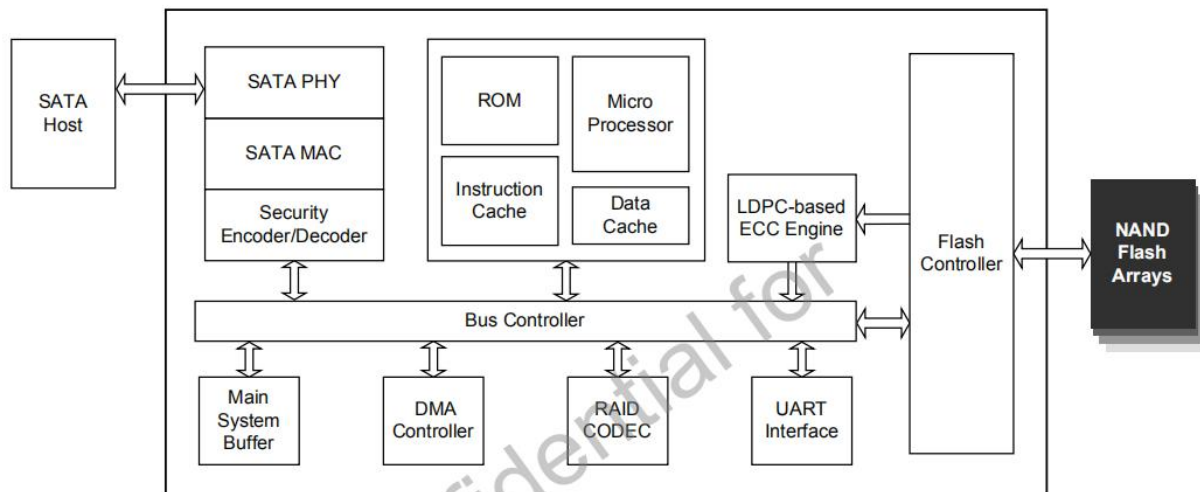


Figure 1 SMI2259XT2 Block Diagram

IV. Product Specifications

4.1 Physical Dimensions

Parameter	Value
Length	100±0.1 mm
width	70±0.1 mm
height	7±0.1 mm

Table 3 Physical dimensions of the driver

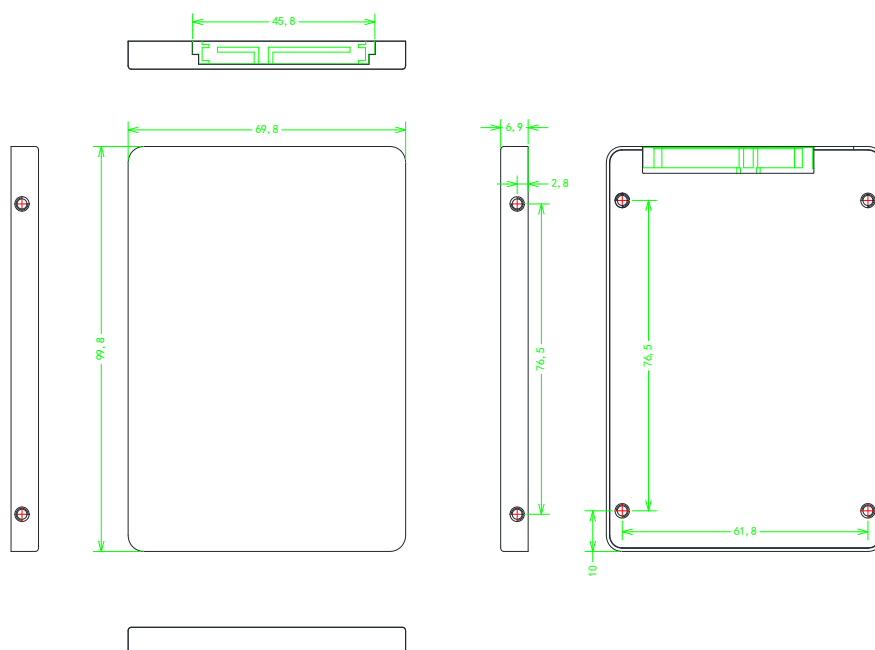


Figure 2 Physical dimensions

4.2 Interface Specification

4.2.1 Pin Assignment

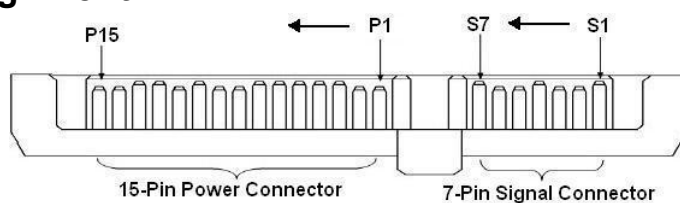


Figure 3 Pin connector

Pin number	Signal name	Description
S1	GND	2 nd mate

S2	A+	Differential signal pair A
S3	A-	From physical layer electronics
S4	GND	2 nd mate
S5	B-	Differential signal pair B
S6	B+	From physical layer electronics
S7	GND	2 nd mate
P1	V33	3.3V power (unused)
P2	V33	3.3V power (unused)
P3	V33	3.3V power,pre-charge,2 nd mate(unused)
P4	GND	1 st mate
P5	GND	2 nd mate
P6	GND	2 nd mate
P7	V5	5V power,pre-charge,2 nd mate
P8	V5	5V power
P9	V5	5V power
P10	GND	2 nd mate
P11	DAS/DSS	Device activity signal/Disable staggered spinal(unused)
P12	GND	1 st mate
P13	V12	12V power,pre-charge,2 nd mate(unused)
P14	V12	12V power(unused)
P15	V12	12V power(unused)

Table 4SATAIII interface pin assignment

4.2.2 Interface Mode

The interface of the 2.5" SATA SSD complies with the standard Serial ATA version 3.1:

- ①Host Transfer Rate is 600MB/s(6.0Gb/s)
- ②PIO mode 0,1,2,3,4
- ③DMA mode 0,1,2
- ④UDMA mode 0,1,2,3,4,5,6

V. Reliability

5.1 ECC Descriptions

The LDPC ECC engine executes parity generation and error detection/correction features, and enhances decoding throughput and data reliability. With LDPC of correction capacity 1e-2 RBER,

the hard and soft decoding mechanism provides powerful error correction. Hence the SMI2259XT2 can enhance the endurance and retention of 3D TLC Nand Flash and extends the SSD lifespan.

5.2 Advance Wear-Leveling Algorithm

The NAND flash devices are limited by a certain number of write cycles. When using a file system, frequent file table updates is mandatory. If some area on the flash wears out faster than others, it would significantly reduce the lifetime of the whole device, even if the erase counts of others are far from the write cycle limit. Thus, if the write cycles can be distributed evenly across the media, the lifetime of the media can be prolonged significantly. The scheme is achieved both via buffer management and specific advanced wear leveling to ensure that the lifetime of the flash media can be increased, and the disk access performance is optimized as well.

5.3 S.M.A.R.T Function

S.M.A.R.T. is an acronym for Self-Monitoring, Analysis and Reporting Technology, an open standard allowing disk drives to automatically monitor their own health and report potential problems. It protects the user from unscheduled downtime by monitoring and storing critical drive performance and calibration parameters. Ideally, this should allow taking proactive actions to prevent impending drive failure. SMART feature adopts the standard SMART command B0h to read data from the drive. When the SMART Utility running on the host, it analyzes and reports the disk status to the host before the device is in critical condition.

VI. Ordering Information

Model	Capacity	PN
H001	512GB	H001-512GB

VII. Related documentation

For more information, Pls contact me :

Attachment

Test platform:

System : Windows 10

CPU: Intel (R) Core(TM) CPU G3930@2.90GHz

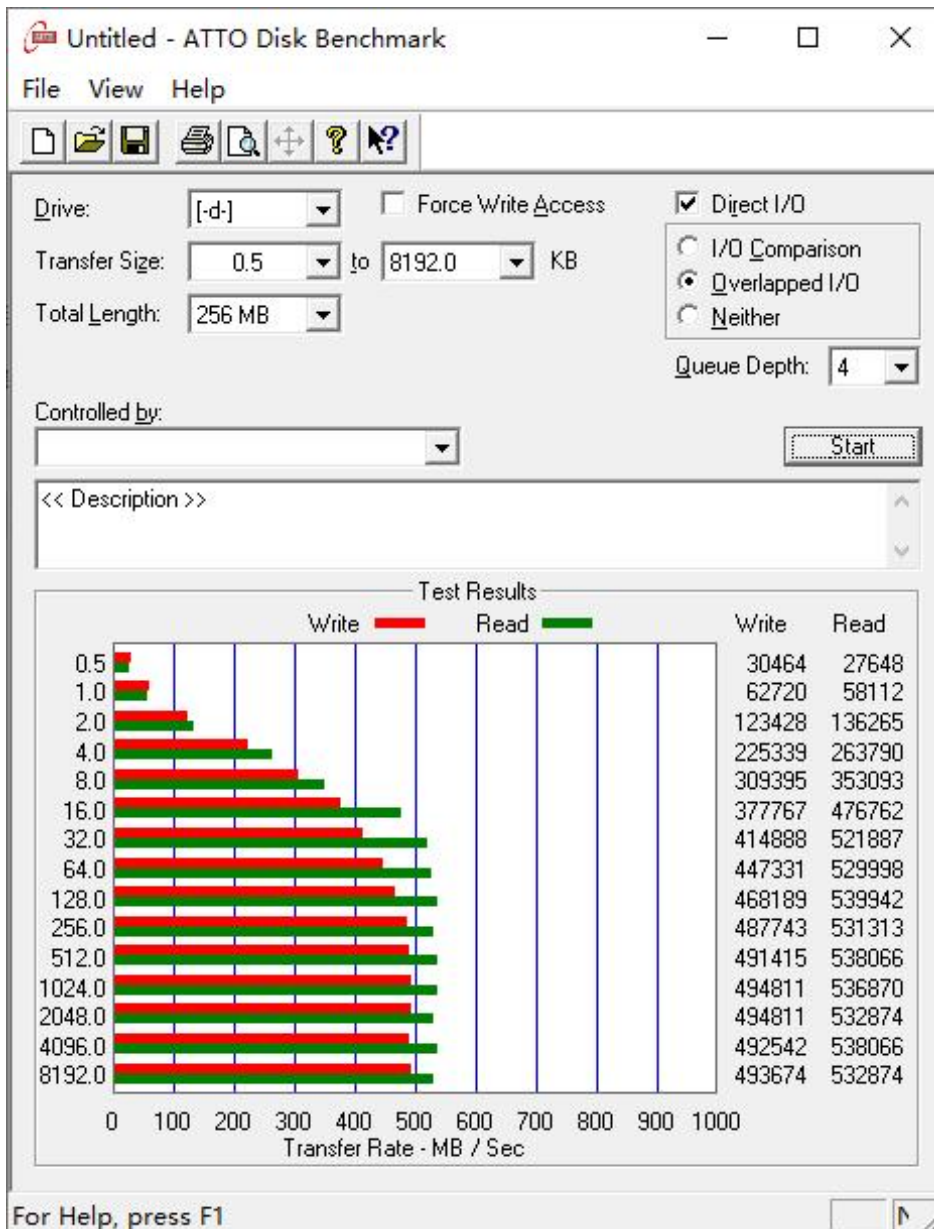
Memory : 4GB

Mother Board: Controller:SMI2258XT,SATA III,120GB

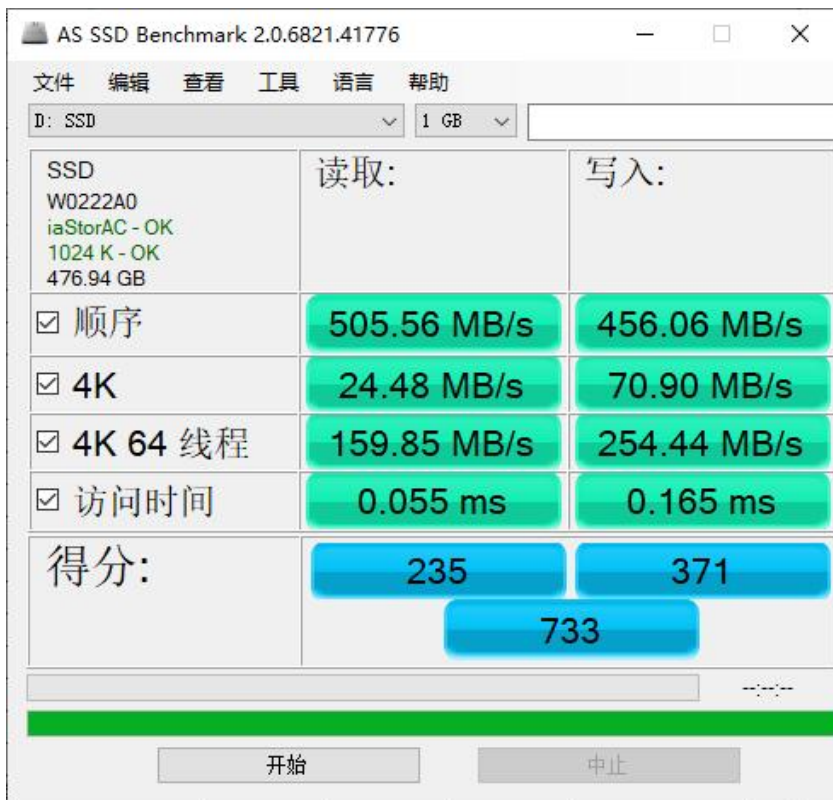
Test SSD:Controller:SMI2259XT2,SATA III,H001 512GB

Test performance picture:

ATTO Disk Benchmark



AS SSD benchmark



Crystal Disk Mark

