



New KingFast Technology

F9 C-Drive Series

KF2710MCS08 SATA Solid State Drive Datasheet

(Based on NAND Flash)

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Table of contents

New KingFast Technology	1
C-Drive Series	1
KF2710MCS08 SATA 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	7
4.2.1 Pin Assignment	7
4.2.2 Interface Mode	7
V. Reliability	8
5.1 ECC Descriptions	8
5.2 Advance Wear-Leveling Algorithm	8
5.3 S.M.A.R.T Function	8
VI. Ordering Information	9
VII. Related documentation	9
Attachment	9

I. Introduction

1 Overview

KingFast 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.

KingFast 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 higher performance and data integrity.

2 Part Type Introduction

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

Type	Capacity	Flash	Interface
KF2710MCS08	64GB	MLC	SATAIII
	128GB	MLC	SATAIII
	256GB	MLC	SATAIII
	512GB	MLC	SATAIII
	1TB	MLC	SATAIII

Table 1 Capacity Specifications

Capacity	Available Capacity	R / W(MB/s)	Random R/W IOPS
64GB	59GB	350/85	43000 / 15000
128GB	118GB	380/150	59000 / 33000
256GB	236GB	510/290	61000 / 33000
512GB	471GB	550/340	61000 / 33000
1TB	974GB	550/450	70000 / 31000

Note: the maximum Read & Write performance test with ATTO Disk Benchmark;
IOPS test with IOmeter 2008.

Outline

Based spec	Interface	SATAIII
	Dimension	100*70*7 mm
	Weight ^①	62~72 g
	Capacity	64GB~1TB
	SDram	256MB/512MB/1GB
	Flash type	MLC NAND Flash
Read/Write Performance^②	Sequential Read	Up to 550MB/s
	Sequential Write	Up to 450MB/s
	4KB Random Read IOPS	70000
	4KB Random Write IOPS	31000
	Response Time	0.2ms
Power Consumption	Power Supply	5V±5%
	Standby	0.3W
	Maximum Ripple	70 mV(peak to peak)
	4KB Random Write	2.5W
Reliability	Write endurance: 8 years @ 100G write/day(32G)	
	Read endurance: unlimited	
	MTBF: >2,000,000 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: Supports BCH ECC 12/14/40 bits in 1024 bytes	
Environment	Storage temperature: -55~95 ℃	
	Operation temperature: 0~75℃	
	Humidity: 5%~95%	
	Vibration	15G (10 to 2000Hz)
	Shock	350G 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: Asrock H67M

Test program: ATTOBenchMark V2.47 (sequential R/W speed)

IOmeter2008 (IOPS)

HD tune V4.6.1 (sustainably R/W speed, access time)

Test Drive: KF2710MCS08-512GB (MLC)

II. Block Diagram

Figure 1: SM2246EN Block Diagram

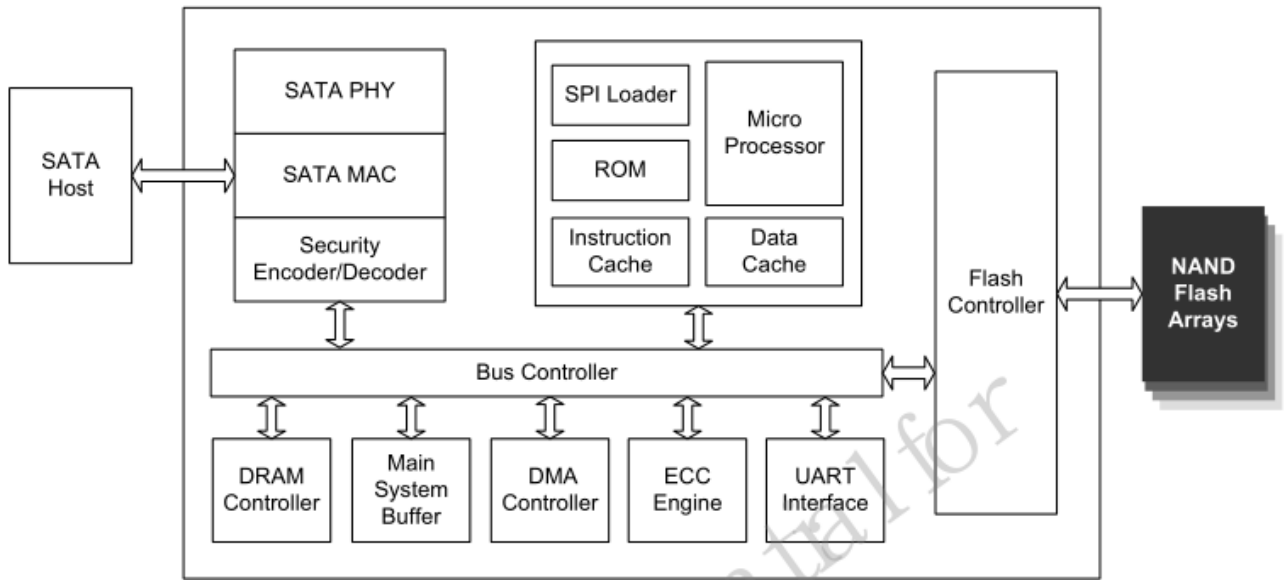


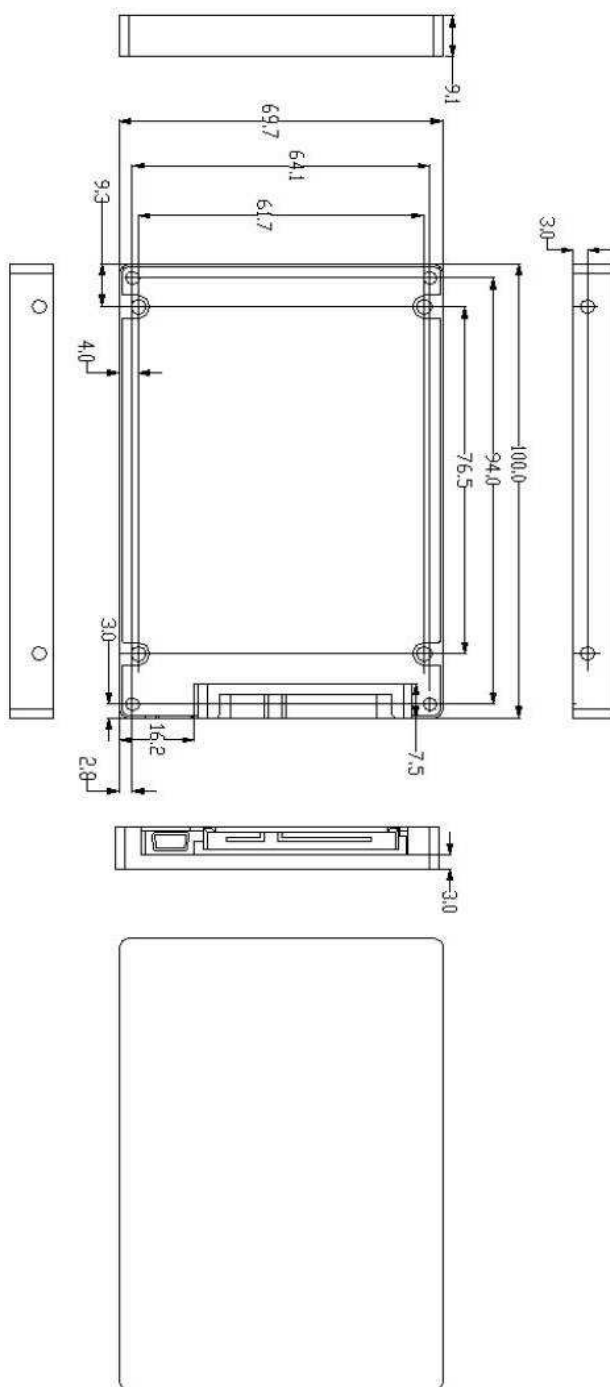
Figure 2 Block Diagram

IV. Product Specifications

4.1 Physical Dimensions

Parameter	Value
Length	100 \pm 0.1 mm
width	70 \pm 0.1 mm
height	7 \pm 0.1 mm

Table 3 Physical dimensions of the driver



4.2 Interface Specification

4.2.1 Pin Assignr

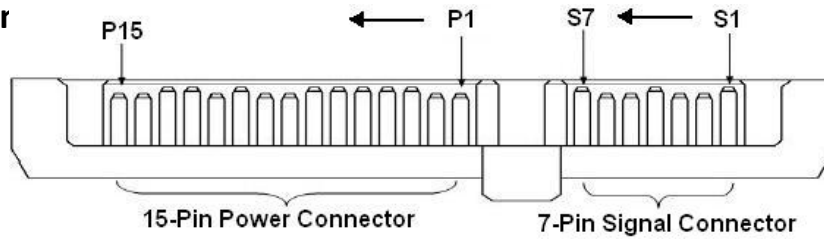


Figure 4 Pin connector

Pin number	Signal name	Description
S1	GND	2 nd mate
S2	A+	Differential signal pair A From physical layer electronics
S3	A-	
S4	GND	2 nd mate
S5	B-	Differential signal pair B From physical layer electronics
S6	B+	
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 4 SATA II 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:

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

V. Reliability

5.1 ECC Descriptions

Please refer to FIG. 5 that is a diagram illustrating an allocating method of a spare area in each page of a NAND flash memory, where in the specific ECC algorithm utilizes a Bose, Chaudhuri and Hocquengham (BCH) ECC algorithm. When a BCH 16 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 28 bytes of the spare area in each page. When a BCH 24 ECC algorithm encodes the data in the NAND flash memory, the parity code generated in the encoding process may occupy 42 bytes of the spare area in each page. When a BCH 16 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors (1024Bytes) is 16. When a BCH 24 algorithm decodes the data in the NAND flash memory, the data can be decoded correctly if the error bit happened in two sectors is 24.

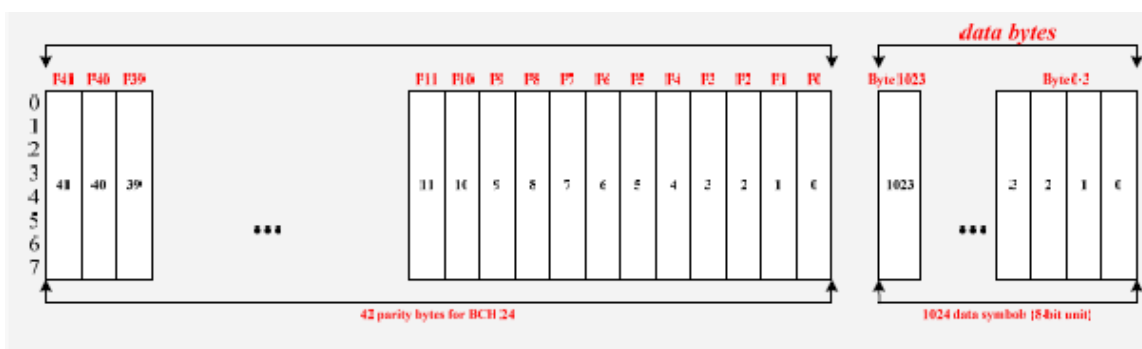


Figure 5 Allocation for ECC algorithm BCH in Nand Flash

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
KF2710MCS08	64GB	KF2710MCS08-064
KF2710MCS08	128GB	KF2710MCS08-128
KF2710MCS08	256GB	KF2710MCS08-256
KF2710MCS08	512GB	KF2710MCS08-512
KF2710MCS08	1TB	KF2710MCS08-010

VII. Related documentation

For more information, visit www.kfast.com.cn

Attachment

Test platform:

System : Windows 7

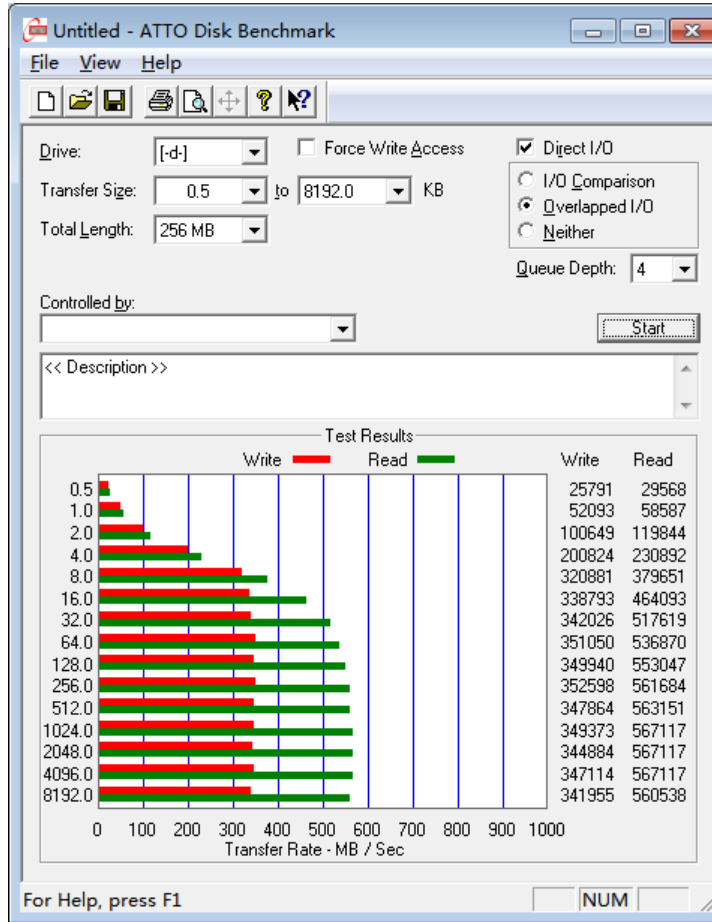
CPU: Intel (R) Core(TM) i3-2100T CPU @2.50GHz

Memory : 4GB

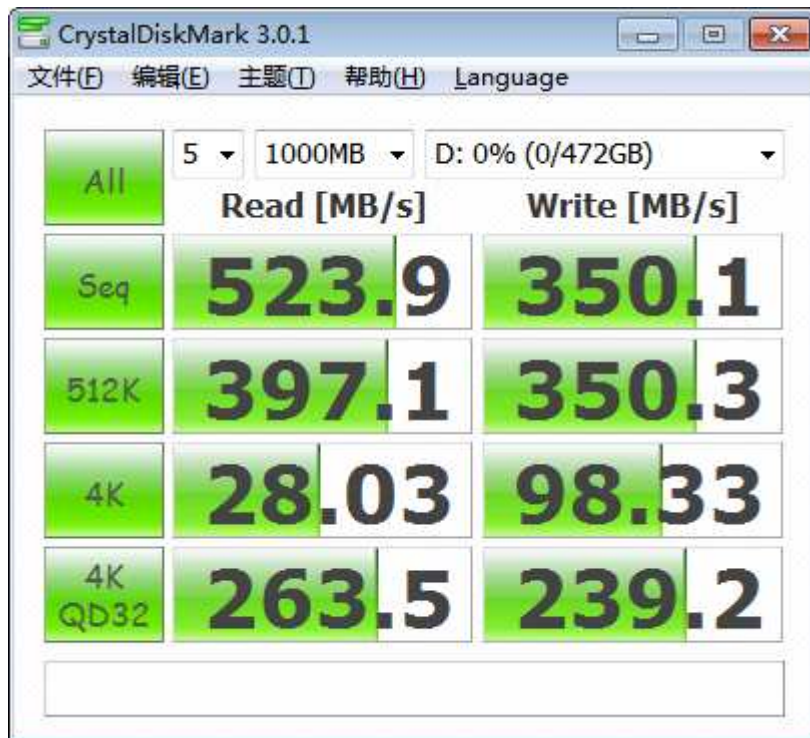
主板: Asrock H67M

SSD: KF2710MCS08-512GB

Test performance picture:



Crystaldiskmark



AS SSD benchmark:

