

Cervoz Industrial SSD

2.5" SATA

Momentum Series (MLC)

M331 Family For ICP Deutschland

Product Datasheet





Revision History

Date	Revision	Description
2015.05.22	1.0	First Released
2015.12.29	1.1	Specification Updated

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1. Product Overview

1.1 Introduction

Cervoz Industrial 2.5" SATA SSD M331 family is a high capacity Solid State Disk product that is in compliance with the 2.5" form factor and SATA III standards. The device design is based on the 7pin for data segment and 15pin for power segment standards. In addition, M331 family has a very unique function named Powerguard. The purpose of Powerguard is to protect data loss while encountering an improper power failure. Powerguard would complete the task of saving the boot files from the controller into the flash storage after sudden power loss. Cervoz designs these flash modules with additional tantalum capacitors to store these extra charges. With this special design, SSD is constantly charging the tantalum capacitors with 12V power during its operation.

M331 family uses superior quality preselected multi-level cell (MLC) NAND flash memory from the industry leading manufacturer Toshiba. This product includes various capacities to choose from.

1.2 Feature

- Compliant with SATA III 6.0Gb/s
- MLC NAND flash memory
- Capacity: 64GB ~ 512GB
- Powerguard Function
- With DDR3 DRAM Buffer
- Operating as boot disk
- Product includes Standard Temperature range
- Static and dynamic wear leveling
- Bad block management
- S.M.A.R.T. & TRIM command

1.3 Product Appearance & Models

Cervoz Industrial 2.5" SATA SSD M331



M331 Family Standard Temp. (0°C ~ 70°C) Model No.	Capacity
CIS-2SM331MJB064GS	64GB
CIS-2SM331MJB128GS	128GB
CIS-2SM331MKB256GS	256GB
CIS-2SM331MLB512GS	512GB

Please Note:

Since certain storage capacity has to be reserved for firmware and controller management purposes; the physical capacity of the SATA flash module will be approximately 92.5% of the indicated capacity. If you need to install an image that has the exact (or close to) the indicated size of the flash module, please choose your flash module with a greater capacity.

2. Product Specifications

2.1 General Specifications

Form Factor	2.5inch
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)
Connector	SATA (7 + 15 pin)
NAND Flash Type	MLC
Capacity	64GB/128GB/256GB/512GB
Sequential Read	up to 530MB/s
Sequential Write	up to 290MB/s
DDR3 DRAM Buffer	Included
ECC Scheme	up to 66bits / 1K Byte
MTBF	2,000,000 hours
TeraByte Written (TBW)	64GB : 63 128GB : 125 256GB : 250 512GB : 500
Low Power Management	DEVSLP mode DIPM / HIPM mode
Supply Voltage	+5V DC +/-5%
Power Consumption	Active mode: < 5000mW Idle mode: < 400mW DEVSLP mode: < 5mW
Dimension (LxWxH)	100.00*69.85*7.00mm

2.2 Performance

The performance was measured with below PC configuration:

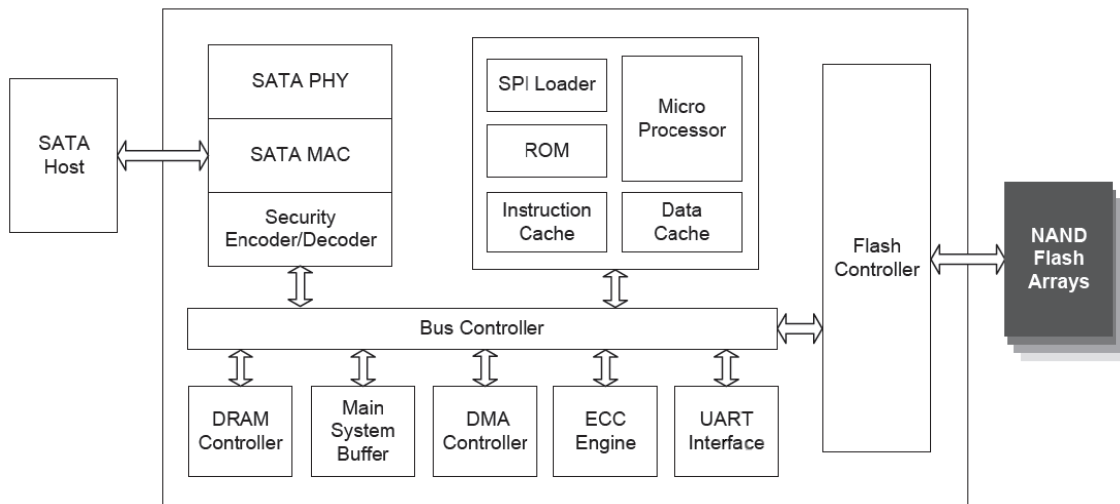
- Platform: ASUS F1A75-M LE(AMD A75 FCH (Hudson D3))
- RAM: Cervoz CIR-S3DUSO1602G(DDR3 2G 1600MHz)
- Operation Systems: Windows 7
- Testing Utility: Crystal Disk Mark v3.0.2
- SATAIII port (6.0 Gb/s) performance

Capacity	64GB	128GB	256GB	512GB
Sequential Read (max.)	440MB/s	485MB/s	495MB/s	530MB/s
Sequential Write (max.)	70MB/s	145MB/s	305MB/s	290MB/s
4KB Random Read (QD32)	160MB/s	250MB/s	250MB/s	280MB/s
4KB Random Write (QD32)	70MB/s	145MB/s	225MB/s	270MB/s

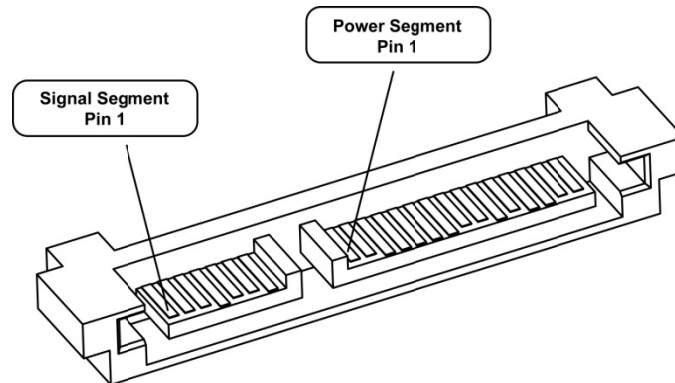
Actual performance may vary depending on use conditions and environment

2.3 Electronic Specifications

2.3.1 Block Diagram



2.3.2 Pin Assignment



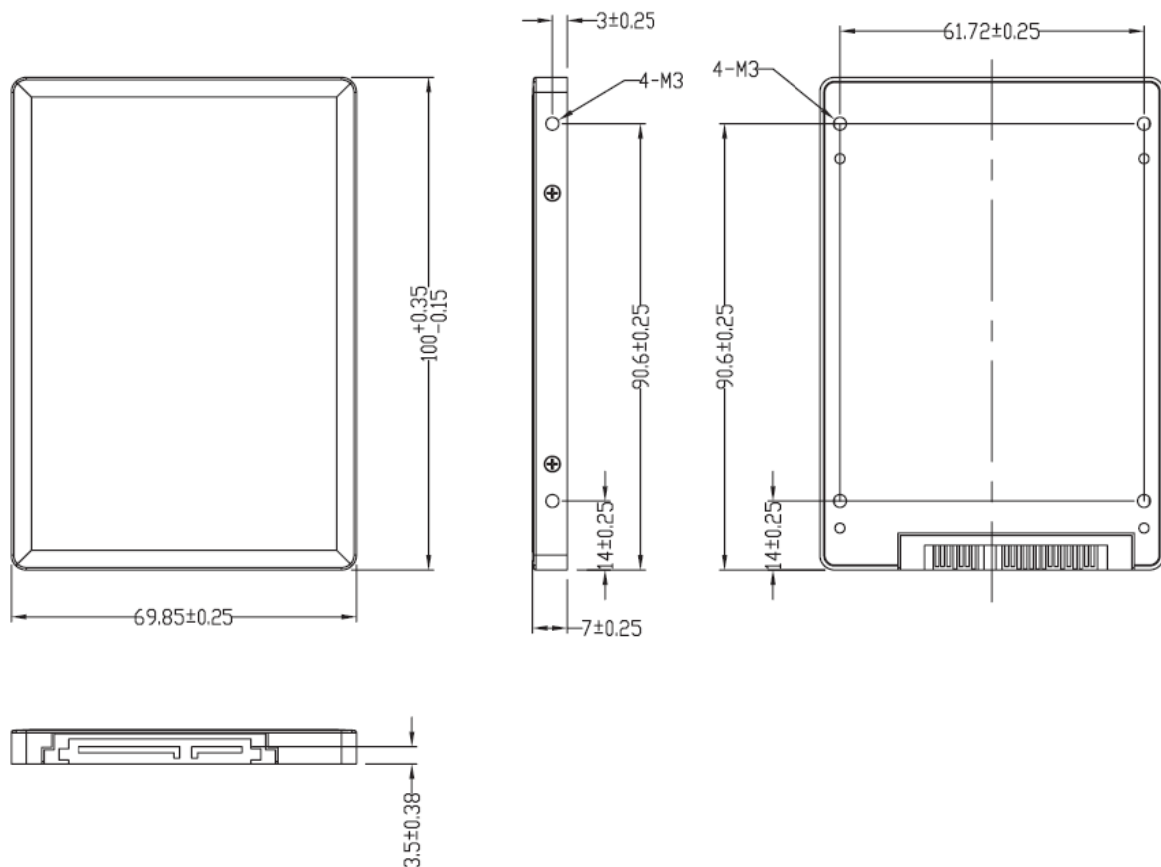
Group	Pin No.	Function	Description
Signal Segment	S1	GND	Ground
	S2	A+	Differential Signal Pair A
	S3	A –	Differential Signal Pair A
	S4	GND	Ground
	S5	B –	Differential Signal Pair B
	S6	B+	Differential Signal Pair B
	S7	GND	Ground
Key & Spacing			
Power Segment	P1	NC	Not Used (3.3V Power)
	P2	NC	Not Used (3.3V Power)
	P3	NC	Not Used (3.3V Power)
	P4	GND	Ground
	P5	GND	Ground
	P6	GND	Ground
	P7	V5	5V Power, Pre-charge
	P8	V5	5V Power
	P9	V5	5V Power
	P10	GND	Ground
	P11	GND	Ground
	P12	GND	Ground
	P13	NC	Not Used
	P14	NC	Not Used
	P15	NC	Not Used

2.4 Environmental Specifications

Type		Value
Temperature	Standard Temperature Operating:	0°C~70°C
	Standard Temperature Storage:	-40°C~85°C
Humidity	Operating & Storage	10~95%, Non-Condensing
Vibration	Operating	20G, 10Hz~2000Hz
Shock	Operating	1500G, 0.5ms

2.5 Mechanical Specifications

Type	Value
Form Factor	2.5" SATA
Length	100.00mm +/-0.25mm
Width	69.85mm +/-0.25mm
Thickness	7.00mm +/-0.25mm



3. Supported Command

3.1 List of Command Sets

Code	Description	Code	Description
00h	NOP	C5h	Write Multiple
06h	Data Set Management	C6h	Set Multiple Mode
20h	Read Sector(s)	C8h	Read DMA
24h	Read Sector(s) Ext	CAh	Write DMA
25h	Read DMA Ext	E0h or 94h	Standby Immediate
27h	Read Native Max Address Ext	E1h or 95h	Idle Immediate
29h	Read Multiple Ext	E2h or 96h	Standby
2Fh	Read Log Ext	E3h or 97h	Idle
30h	Write Sector(s)	E4h	Read Buffer
34h	Write Sector(s) Ext	E5h or 98h	Check Power Mode
35h	Write DMA Ext	E6h or 99h	Sleep
37h	Set Max Address Ext	E7h	Flush Cache
39h	Write Multiple Ext	E8h	Write Buffer
40h or 41h	Read Verify Sector(s)	EAh	Flush Cache Ext
42h	Read Verify Sector(s) Ext	ECh	Identify Device
60h	Read FPDMA Queued	EFh	Set Feature
61h	Write FPDMA Queued	F1h	Security Set Password
70h	Seek	F2h	Security Unlock
90h	Execute Drive Diagnostic	F3h	Security Erase Prepare
91h	Initialize Drive Parameters	F4h	Security Erase Unit
B0h	SMART Disable Operations	F5h	Security Freeze Lock
B0h	SMART Enable/Disable Autosave	F6h	Security Disable Password
B0h	SMART Enable Operations	F8h	Read Native Max Address
B0h	SMART Execute OFF-LINE Immediate	F9h	Set Max Address
B0h	SMART Read Data	F9h	Set Max Set Password
B0h	SMART Read Threshold	F9h	Set Max Lock
B0h	SMART Return Status	F9h	Set Max Freeze Lock
B0h	SMART Save Attribute Values	F9h	Set Max Unlock
C4h	Read Multiple		

4. Part No. Decoder

4.1 Part No. Decoder

1	-	2	3	4	5	6	7	8	9
Product Line	-	Form Factor	Product Series	Cervoz Family Code (Bus / Internal Control)	Flash Brand	Flash Capacity	Flash Mode	Module Capacity	Operating Temp.
XXX	-	XX	X	XXX	X	X	X	XXXX	X

1. Product Line

CIS	Cervoz Industrial SSD
CIM	Cervoz Industrial Memory Card
CIE	Cervoz Industrial Embedded Module

2. Form Factor

2S	2.5" SATA
2P	2.5" PATA
CF	CompactFlash
CA	CFast
MS	mSATA
HM	Half Size mSATA
HS	Half Slim
M4	M.2 2242
M6	M.2 2260
M8	M.2 2280
0V	PATA Disk 40pin Vertical
4V	PATA Disk 44pin Vertical
4L	PATA Disk 44pin Horizontal Left
7T	SATA Disk 7pin Vertical Tall
7L	SATA Disk 7pin Horizontal Left
7R	SATA Disk 7pin Horizontal Right

3. Product Series

S	Supreme Series (SLC)
R	Reliance Series (RO-MLC)
M	Momentum Series (MLC)

4. Cervoz Family Code

Bus and Internal Control for Cervoz Product Families

5. Flash Brand

M	Micron
T	Toshiba

6. Flash Capacity

A	256Mb
B	512Mb

C	1Gb
D	2Gb
E	4Gb
F	8Gb
G	16Gb
H	32Gb
I	64Gb
J	128Gb
K	256Gb
L	512Gb
M	1Tb

7. Flash Mode

Internal Control for Flash Mode

8. Module Capacity

128M	128MB
256M	256MB
512M	512MB
001G	1GB
002G	2GB
004G	4GB
008G	8GB
016G	16GB
032G	32GB
064G	64GB
128G	128GB
256G	256GB
512G	512GB

9. Operating Temperature

S	Standard Grade (0~ +70°C)
W	Wide Temperature Grade (-40 ~ +85°C)