

Cervoz Industrial Embedded Module

mSATA

Momentum Series (MLC)

M310 Family

Product Datasheet



Date: 2016.04.13

Revision: 2.1

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Revision History

Date	Revision	Description
2015.02.02	1.0	First Released
2015.04.13	1.1	TeraByte Written (TBW) Information Added
2015.11.20	2.0	New Manufacturing Process for NAND Flash IC 1.3 Ordering Information Changed 2.1 Power Consumption Updated 4.1 Part No. Decoder Updated
2016.04.13	2.1	2.1 Performance Updated



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1. Product Overview

1.1 Introduction

Cervoz Industrial mSATA Embedded Module M310 family is a Solid State Flash Disk product that is in compliance with the mSATA and SATA III standards. mSATA M310 family fits in any mSATA sockets in a PC or motherboard; it can be used for both booting and storage purposes.

M310 family uses superior quality preselected multi-level cell (MLC) NAND flash memory from the industry leading manufacturer Toshiba. This product includes both standard temperature range and wide temperature range options with various capacities to choose from.

M310 family offers outstanding performance and reliability; the product family is a perfect solution for price sensitive semi-industrial and general industrial applications.

1.2 Feature

- Compliant with SATA III 6.0Gb/s
- MLC NAND flash memory
- Capacity: 4GB ~ 256GB
- Operating as boot disk
- Product includes Standard Temperature range & Wide Temperature range
- Static and dynamic wear leveling
- Bad block management
- S.M.A.R.T. & TRIM command

1.3 Product Appearance & Models

Cervoz Industrial mSATA Module M310



M310 Family Standard Temp. (0°C ~ 70°C) Model No.	M310 Family Wide Temp. (-40°C ~ 85°C) Model No.	Capacity
CIE-MSM310THC004GS	CIE-MSM310THC004GW	4GB
CIE-MSM310THC008GS	CIE-MSM310THC008GW	8GB
CIE-MSM310TIC016GS	CIE-MSM310TIC016GW	16GB
CIE-MSM310TIC032GS	CIE-MSM310TIC032GW	32GB
CIE-MSM310TJC064GS	CIE-MSM310TJC064GW	64GB
CIE-MSM310TKD128GS	CIE-MSM310TKD128GW	128GB
CIE-MSM310TLD256GS	CIE-MSM310TLD256GW	256GB

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.

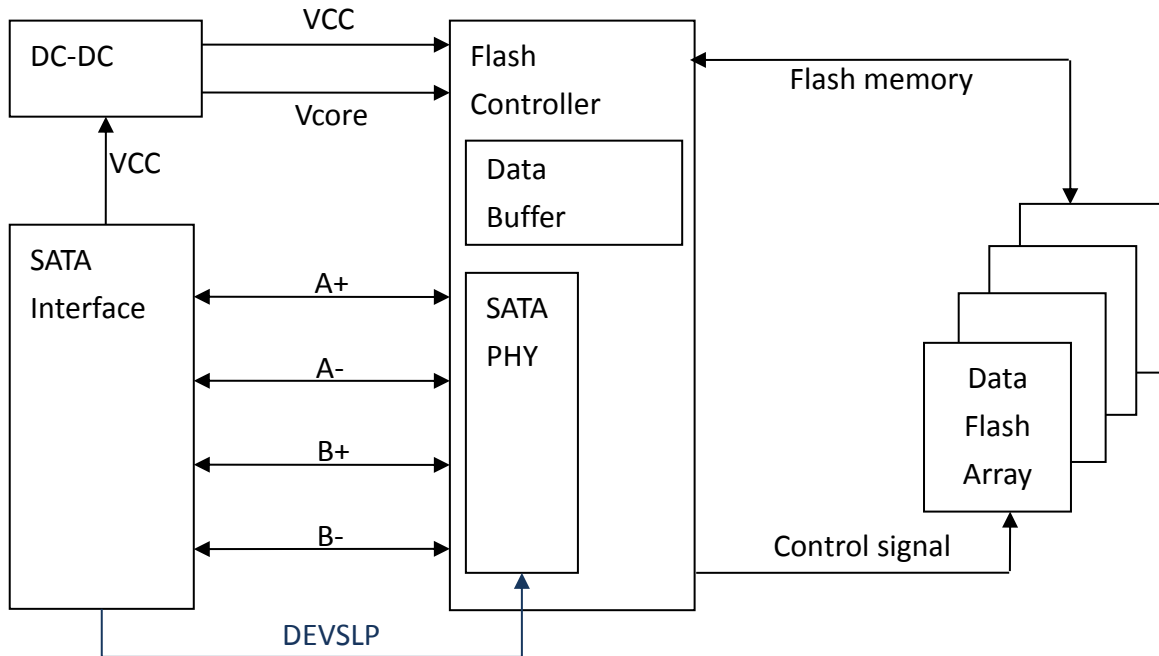
2. Product Specifications

2.1 General Specifications

Form Factor	mSATA
Interface	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)
Connector	mSATA
NAND Flash Type	MLC
Capacity	4GB/8GB/16GB/32GB/64GB/128GB/256GB
Sequential Read	up to 490MB/s
Sequential Write	up to 180MB/s
ECC Scheme	up to 72bits / 1K Byte
MTBF	2,000,000 hours
TeraByte Written (TBW)	4GB : 4 8GB : 8 16GB : 16 32GB : 31 64GB : 63 128GB : 125 256GB : 250
Low Power Management	DEVSLP mode (Optional) DIPM/HIPM mode
Supply Voltage	+3.3V DC +/-5%
Power Consumption	Active mode: < 2305mW Idle mode: < 325mW DEVSLP mode: < 5mW
Dimension (LxWxH)	50.80*29.85*4.00mm

2.2 Electronic Specifications

2.2.1 Block Diagram



2.2.2 Pin Assignment



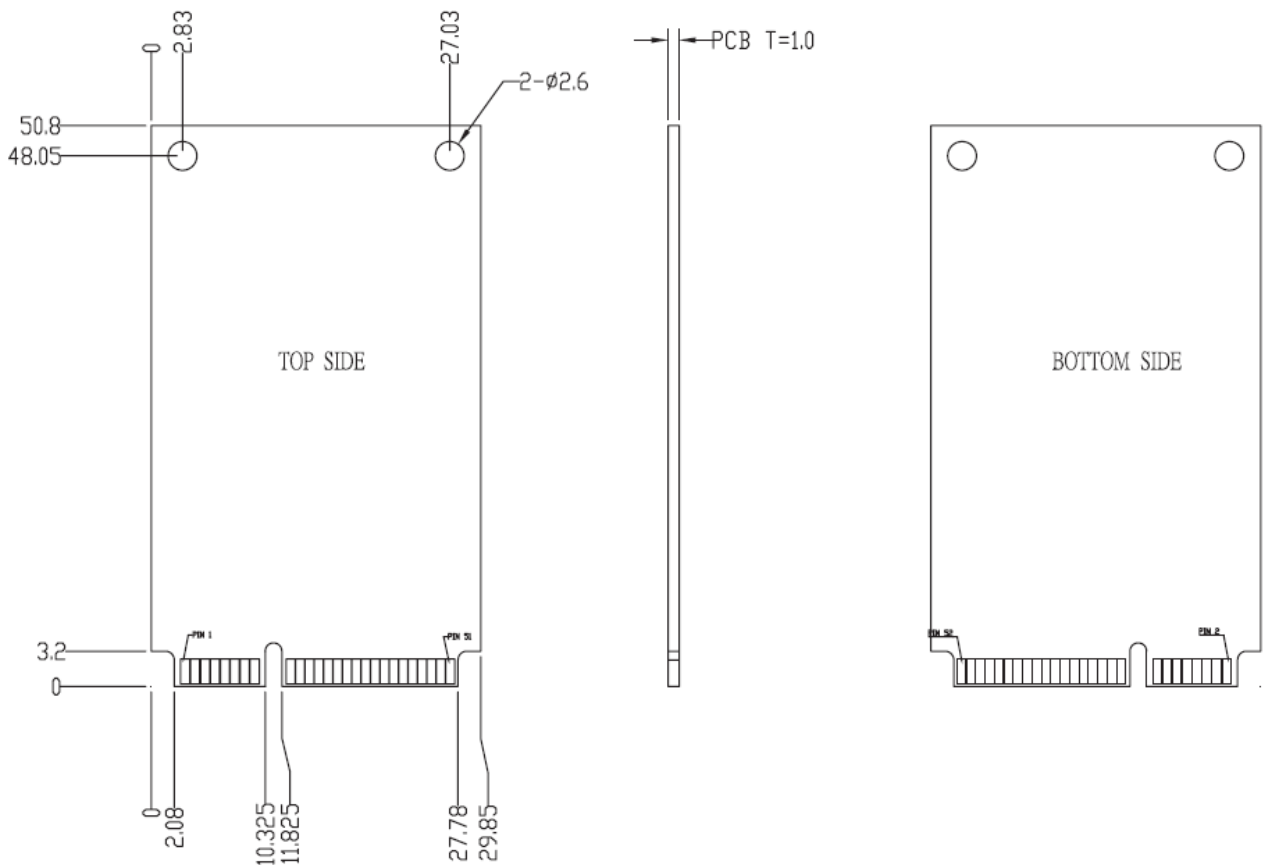
Pin #	Pin Description	Signal Name	Pin #	Pin Description	Signal Name
1	Not Used	NC	27	Ground	GND
2	3.3V power in	+3.3V	28	Not Used	NC
3	Not Used	NC	29	Ground	GND
4	Ground	GND	30	Not Used	NC
5	Not Used	NC	31	SATA Rxn	-A – RX-
6	Not Used	NC	32	Not Used	NC
7	Not Used	NC	33	SATA Rxp	+A – RX-
8	Not Used	NC	34	Ground	GND
9	Ground	GND	35	Ground	GND
10	Not Used	NC	36	Not Used	NC
11	Not Used	NC	37	Ground	GND
12	Not Used	NC	38	Not Used	NC
13	Not Used	NC	39	3.3V power in	+3.3V
14	Not Used	NC	40	Ground	GND
15	Ground	GND	41	3.3V power in	+3.3V
16	Not Used	NC	42	Not Used	NC
17	Not Used	NC	43	Not Used	NC
18	Ground	GND	44	Enter/Exit Device Sleep	DEVSLP
19	Not Used	NC	45	Not Used	NC
20	Not Used	NC	46	Not Used	NC
21	Ground	GND	47	Not Used	NC
22	Not Used	NC	48	Not Used	NC
23	SATA Txp	+B - TX+	49	DA/DSS	DA/DSS
24	3.3V power in	+3.3V	50	Ground	GND
25	SATA Txn	-B - TX-	51	Default connect to GND	GND
26	Ground	GND	52	3.3V power in	+3.3V

2.3 Environmental Specifications

Type		Value
Temperature	Standard Temperature Operating:	0°C~70°C
	Standard Temperature Storage:	-40°C~85°C
	Wide Temperature Operating:	-40°C~85°C
	Wide Temperature Storage:	-50°C~95°C
Humidity	Operating & Storage	10~95%, Non-Condensing
Vibration	Operating	20G, 10Hz~2000Hz
Shock	Operating	1500G, 0.5ms

2.4 Mechanical Specifications

Type	Value
Form Factor	mSATA
Length	50.80mm +/-0.30mm
Width	29.85mm +/-0.30mm
Thickness	4.00mm +/-0.30mm



3. Supported Command

3.1 List of Command Sets

Code	Description	Code	Description
00h	NOP	97h	IDLE
06h	Data Set Management	98h	CHECK POWER MODE
10h-1Fh	Recalibrate	99h	SLEEP
20h	Read Sectors	B0h	SMART
21h	Read Sectors without Retry	B1h	DEVICE CONFIGURATION
24h	Read Sectors EXT	C4h	Read Multiple
25h	Read DMA EXT	C5h	Write Multiple
27h	Read Native Max Address EXT	C6h	Set Multiple Mode
29h	Read Multiple EXT	C8h	Read DMA
2Fh	Read Log EXT	C9h	Read DMA without Retry
30h	Write Sectors	CAh	Write DMA
31h	Write Sectors without Retry	CBh	Write DMA without Retry
34h	Write Sectors EXT	CEh	Write Multiple FUA EXT
35h	Write DMA EXT	E0h	Standby Immediate
37h	Set Native Max Address EXT	E1h	Idle Immediate
38h	CFA WRITE SECTORS WITHOUT ERASE	E2h	Standby
39h	Write Multiple EXT	E3h	Idle
3Dh	Write DMA FUA EXT	E4h	Read Buffer
3Fh	Write Long EXT	E5h	Check Power Mode
40h	Read Verify Sectors	E6h	Sleep
41h	Read Verify Sectors without Retry	E7h	Flush Cache
42h	Read Verify Sectors EXT	E8h	Write Buffer
45h	WRITE UNCORRECTABLE EXT	EAh	Flush Cache EXT
60h	Read FPDMA Queued	ECh	Identify Device
61h	Write FPDMA Queued	EFh	Set Features
70h-7Fh	Seek	F1h	Security Set Password
90h	Execute Device Diagnostic	F2h	Security Unlock
91h	Initialize Device Parameters	F3h	Security Erase Prepare
92h	Download Microcode	F4h	Security Erase Unit
93h	DOWNLOAD MICROCODE DMA	F5h	Security Freeze Lock
94h	STANDBY IMMEDIATE	F6h	Security Disable Password
95h	IDLE IMMEDIATE	F8h	Read Native Max Address
96h	STANDBY	F9h	Set Max Address

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)