

# Cervoz Industrial Embedded Module

M.2 2280

Momentum Series (MLC)

M310 Family

*Product Datasheet*



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Revision: 2.1

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## Revision History

Date	Revision	Description
2015.07.17	1.0	First Released
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 M.2 2280 Embedded Module M310 family is a Solid State Flash Disk product that is in compliance with the M.2 and SATA III standards. M.2 2280 M310 family fits in any M.2 2280 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: 16GB ~ 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 M.2 2280 Module M310



M310 Family Standard Temp. (0°C ~ 70°C) Model No.	M310 Family Wide Temp. (-40°C ~ 85°C) Model No.	Capacity
CIE-M8M310TIC016GS	CIE-M8M310TIC016GW	16GB
CIE-M8M310TJC032GS	CIE-M8M310TJC032GW	32GB
CIE-M8M310TJC064GS	CIE-M8M310TJC064GW	64GB
CIE-M8M310TKD128GS	CIE-M8M310TKD128GW	128GB
CIE-M8M310TLD256GS	CIE-M8M310TLD256GW	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.

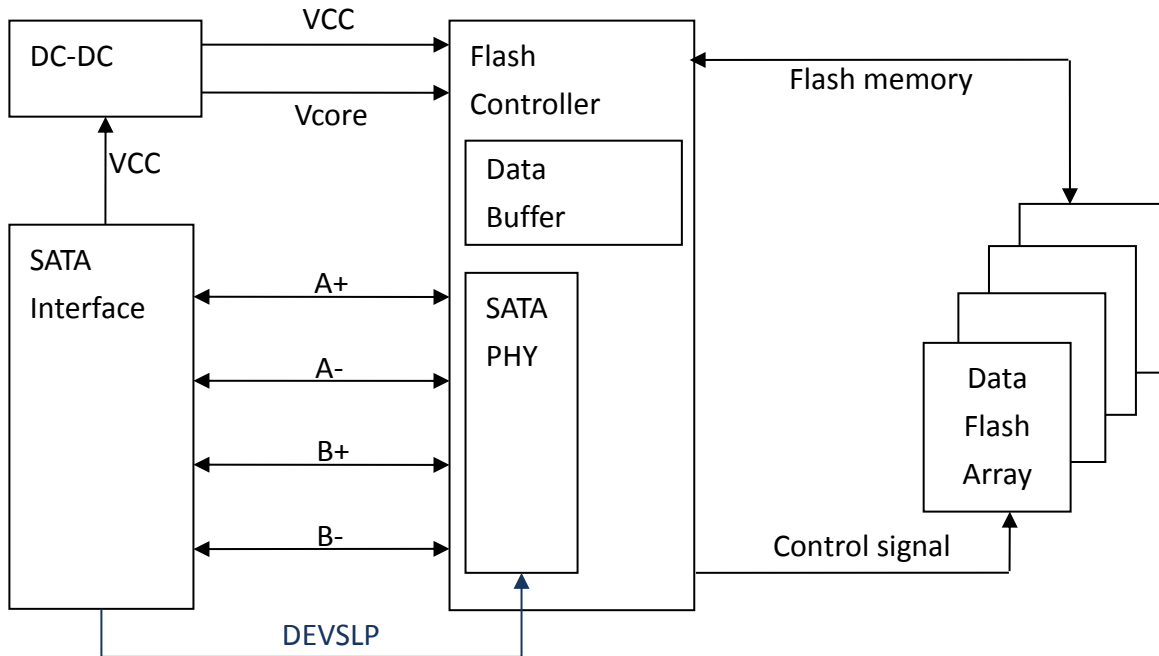
## 2. Product Specifications

### 2.1 General Specifications

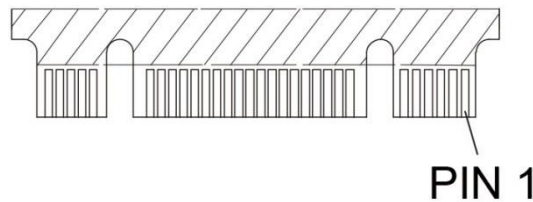
<b>Form Factor</b>	M.2 2280
<b>Interface</b>	SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)
<b>Connector</b>	M.2
<b>NAND Flash Type</b>	MLC
<b>Capacity</b>	16GB/32GB/64GB/128GB/256GB
<b>Sequential Read</b>	up to 490MB/s
<b>Sequential Write</b>	up to 180MB/s
<b>ECC Scheme</b>	up to 72bits / 1K Byte
<b>MTBF</b>	2,000,000 hours
<b>TeraByte Written (TBW)</b>	16GB : 16 32GB : 31 64GB : 63 128GB : 125 256GB : 250
<b>Low Power Management</b>	DEVSLP mode (Optional) DIPM/HIPM mode
<b>Supply Voltage</b>	+3.3V DC +/-5%
<b>Power Consumption</b>	Active mode: < 2305mW Idle mode: < 315mW DEVSLP mode: < 5mW
<b>Dimension (LxWxH)</b>	80.00*22.00*3.90mm

## 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	Ground	CONFIG_3 = GND	12	Module Key	Key
2	3.3V power in	+3.3V	13	Module Key	Key
3	Ground	GND	14	Module Key	Key
4	3.3V power in	+3.3V	15	Module Key	Key
5	Not Used	NC	16	Module Key	Key
6	Not Used	NC	17	Module Key	Key
7	Not Used	NC	18	Module Key	Key
8	Not Used	NC	19	Module Key	Key
9	Not Used or Ground	NC or GND <sup>Note</sup>	20	Not Used	NC
10	LED/DAS/DSS	DAS/DSS# (O) (OD)	21	Ground	CONFIG_0 = GND
11	Not Used	NC	22	Not Used	NC

Pin #	Pin Description	Signal Name	Pin #	Pin Description	Signal Name
23	Not Used	NC	50	Not Used	NC
24	Not Used	NC	51	Ground	GND
25	Not Used	NC	52	Not Used	NC
26	Not Used	NC	53	Not Used	NC
27	Ground	GND	54	Not Used	NC
28	Not Used	NC	55	Not Used	NC
29	Not Used	NC	56	MFG Data	NC
30	Not Used	NC	57	Ground	GND
31	Not Used	NC	58	MFG Clock	NC
32	Not Used	NC	59	Module Key	Key
33	Ground	GND	60	Module Key	Key
34	Not Used	NC	61	Module Key	Key
35	Not Used	NC	62	Module Key	Key
36	Not Used	NC	63	Module Key	Key
37	Not Used	NC	64	Module Key	Key
38	Enter/Exit Device Sleep	DEVSLP (I) (0/3.3V)	65	Module Key	Key
39	Ground	GND	66	Module Key	Key
40	Not Used	NC	67	Not Used	NC
41	SATA Txp	+B – TX+	68	32kHz clock supply	SUSCLK (I) (0/3.3V)
42	Not Used	NC	69	Defines module type	CONFIG_1 = GND
43	SATA Txn	-B – TX-	70	3.3V power in	+3.3V
44	Not Used	NC	71	Ground	GND
45	Ground	GND	72	3.3V power in	+3.3V
46	Not Used	NC	73	Ground	GND
47	SATA Rxn	-A – RX-	74	3.3V power in	+3.3V
48	Not Used	NC	75	Ground	CONFIG_2 = GND
49	SATA Rxp	+A – RX+			

**Note:** NC for Socket 2, and GND for Socket 3.

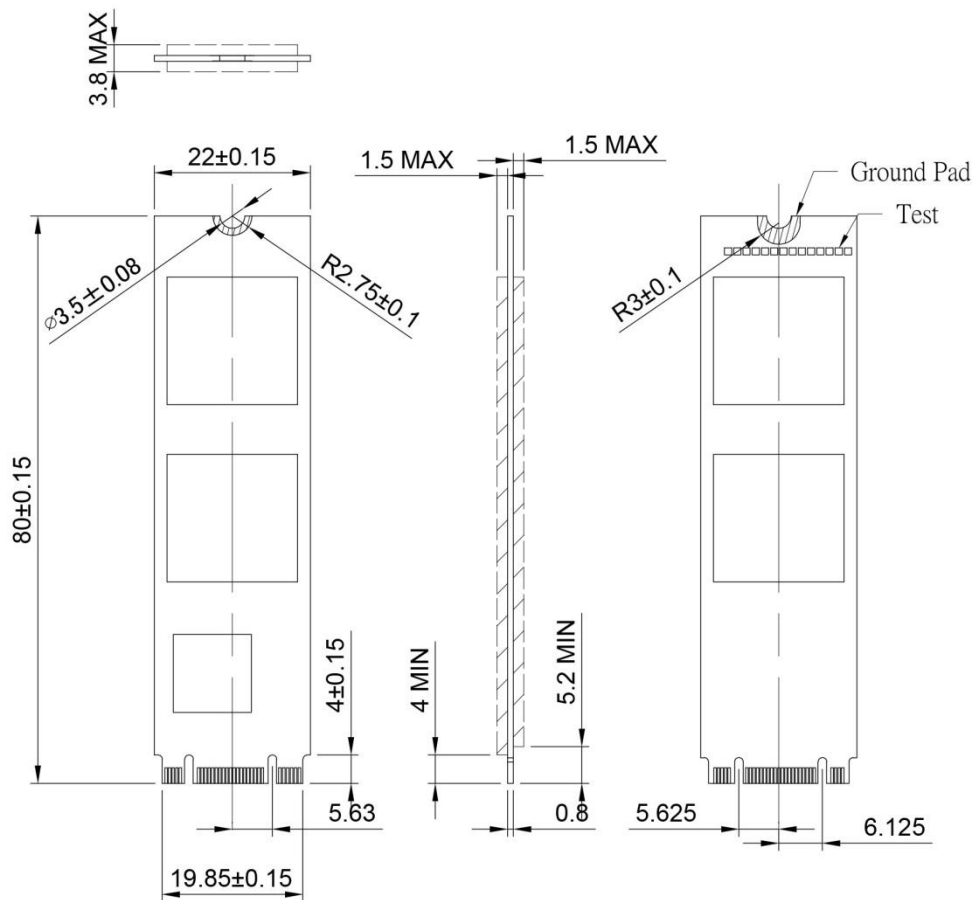


### 2.3 Environmental Specifications

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	M.2 2280
Length	80.00mm +/-0.15mm
Width	22.00mm +/-0.15mm
Thickness	3.90mm +/-0.08mm



### 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)