

# Cervoz Industrial Embedded Module

SATA Disk 7pin Horizontal Left

Momentum Series (MLC)

M310 Family

*Product Datasheet*



Date: 2015.04.27

Revision: 1.0

File: Cervoz\_Industrial\_Embedded\_Module\_SATA\_Disk\_7pin\_Horizontal\_Left\_M310\_Datasheet\_Rev1.0

## Revision History

| Date       | Revision | Description    |
|------------|----------|----------------|
| 2015.04.27 | 1.0      | First Released |

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## **1. Product Overview**

### **1.1 Introduction**

Cervoz Industrial SATA Disk 7pin Horizontal Left Embedded Module M310 is a Solid State Flash Disk product that is in compliance with the SATA III standards. The SATA Disk 7pin Horizontal Left Embedded Module M310 is in low profile form factor and fits in any SATA sockets internally of a PC or on a motherboard; it can be used for both booting or storage purposes.

M310 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 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 ~ 64GB
- 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 SATA Disk 7pin Horizontal Left Module M310



| M310 Family<br>Standard Temp. (0°C ~ 70°C)<br>Model No. | M310 Family<br>Wide Temp. (-40°C ~ 85°C)<br>Model No. | Capacity |
|---------------------------------------------------------|-------------------------------------------------------|----------|
| CIE-7LM310THT004GS                                      | CIE-7LM310THT004GW                                    | 4GB      |
| CIE-7LM310THT008GS                                      | CIE-7LM310THT008GW                                    | 8GB      |
| CIE-7LM310TIT016GS                                      | CIE-7LM310TIT016GW                                    | 16GB     |
| CIE-7LM310TJT032GS                                      | CIE-7LM310TJT032GW                                    | 32GB     |
| CIE-7LM310TKT064GS                                      | CIE-7LM310TKT064GW                                    | 64GB     |

#### 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.

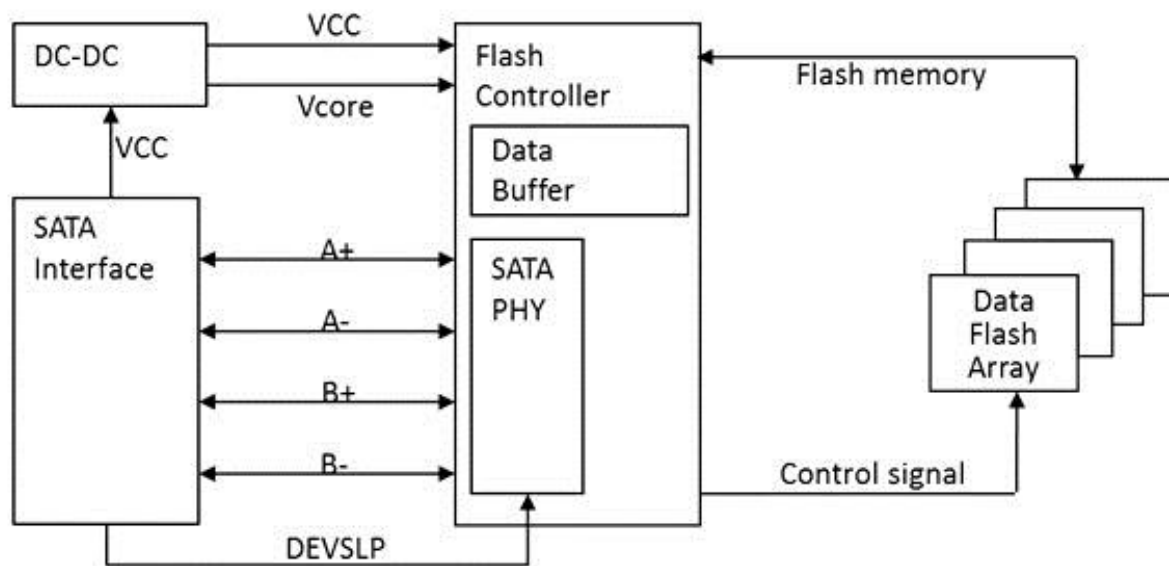
## 2. Product Specifications

### 2.1 General Specifications

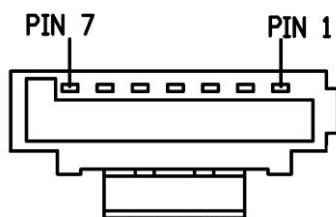
|                               |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| <b>Form Factor</b>            | SATA Disk 7pin Horizontal Left                                    |
| <b>Interface</b>              | SATA III 6.0Gb/s (backward compatible to 3.0Gb/s, 1.5Gb/s)        |
| <b>Connector</b>              | SATA (7pin)                                                       |
| <b>NAND Flash Type</b>        | MLC                                                               |
| <b>Capacity</b>               | 4GB/8GB/16GB/32GB/64GB                                            |
| <b>Sequential Read</b>        | up to 330MB/s                                                     |
| <b>Sequential Write</b>       | up to 175MB/s                                                     |
| <b>ECC Scheme</b>             | up to 72bits / 1K Byte                                            |
| <b>MTBF</b>                   | 2,000,000 hours                                                   |
| <b>TeraByte Written (TBW)</b> | 4GB : 4<br>8GB : 8<br>16GB : 16<br>32GB : 31<br>64GB : 63         |
| <b>Low Power Management</b>   | DEVSLP mode (Optional)<br>DIPM/HIPM mode                          |
| <b>Supply Voltage</b>         | +5.0V DC +/-5%                                                    |
| <b>Power Consumption</b>      | Active mode: < 1955mW<br>Idle mode: < 315mW<br>DEVSLP mode: < 5mW |
| <b>Dimension (LxWxH)</b>      | 48.5*22.20*12.00mm                                                |

## 2.2 Electronic Specifications

### 2.2.1 Block Diagram



## 2.2.2 Pin Assignment



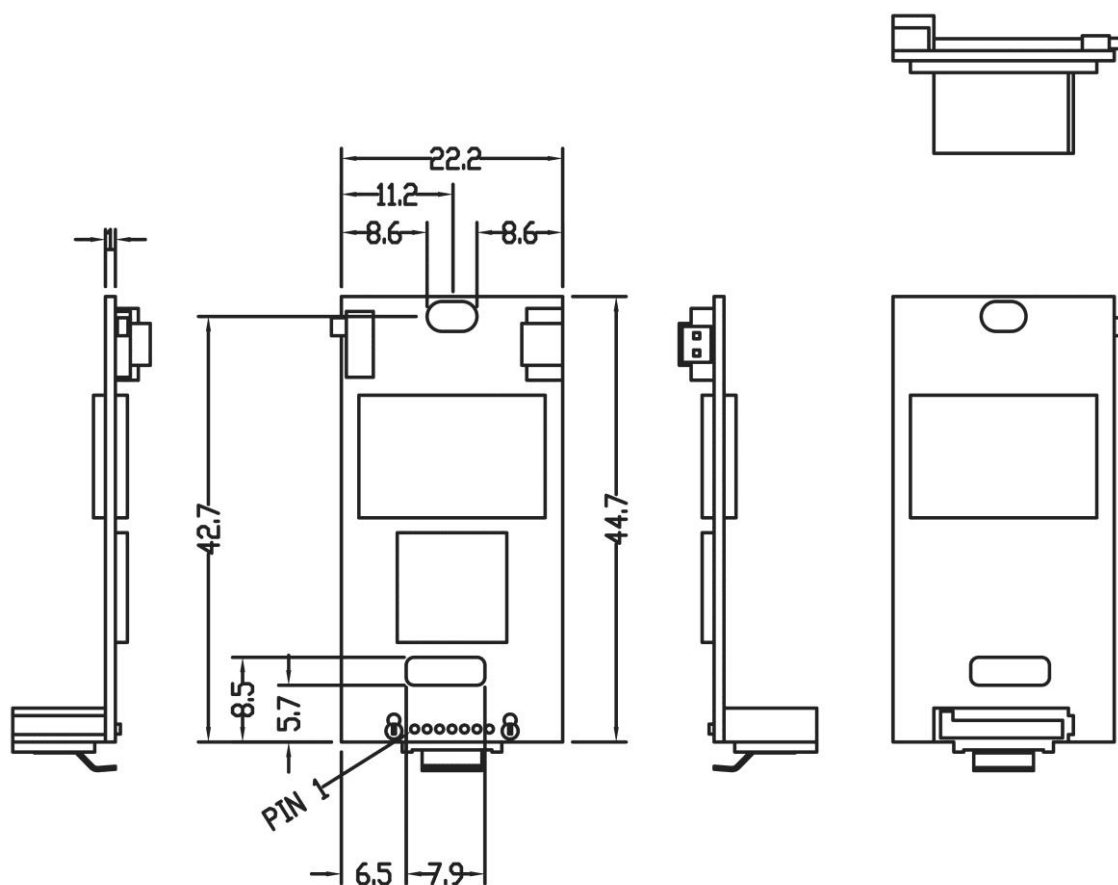
| Pin No. | Function | Description                |
|---------|----------|----------------------------|
| S1      | GND      | Ground                     |
| S2      | RX+      | Differential signal pair A |
| S3      | RX-      |                            |
| S4      | GND      | Ground                     |
| S5      | TX-      | Differential signal pair B |
| S6      | TX+      |                            |
| S7      | GND      | Ground                     |

## 2.3 Environmental Specifications

| Type               |                                 | Value                  |
|--------------------|---------------------------------|------------------------|
| <b>Temperature</b> | 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             |
| <b>Humidity</b>    | Operating & Storage             | 10~95%, Non-Condensing |
| <b>Vibration</b>   | Operating                       | 20G, 10Hz~2000Hz       |
| <b>Shock</b>       | Operating                       | 1500G, 0.5ms           |

## 2.4 Mechanical Specifications

| Type        | Value             |
|-------------|-------------------|
| Form Factor | SATA Disk         |
| Length      | 48.50mm +/-0.30mm |
| Width       | 22.20mm +/-0.30mm |
| Thickness   | 12.00mm +/-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<br>(Bus / Internal Control) | Flash Brand | Flash Capacity | Die Package | 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                           |
| HS | Half Slim                       |
| 0V | PATA Disk 40pin Vertical        |
| 4V | PATA Disk 44pin Vertical        |
| 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. Die Package

|   |      |
|---|------|
| T | TSOP |
| B | BGA  |

## 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) |