

# Cervoz Industrial Embedded Module

PATA Disk 44pin Horizontal Left

Supreme Series (SLC)

S130 Family

*Product Datasheet*



Date: 2015.05.15

Revision: 1.0

File: Cervoz\_Industrial\_Embedded\_Module\_PATA\_Disk\_44pin\_Horizontal\_Left\_S130\_Datasheet\_Rev1.0



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## Revision History

| Date       | Revision | Description    |
|------------|----------|----------------|
| 2015.05.15 | 1.0      | First Released |

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## 1. Product Overview

### 1.1 Introduction

Cervoz Industrial PATA Disk 44pin Horizontal Left Embedded Module S130 family is a Solid State Disk product that is in compliance with the PATA standards. The PATA Disk 44pin Horizontal Left Embedded Module S130 family is in low profile form factor and fits in any 44pin PATA sockets internally of a PC or on a motherboard; it can be used for both booting or storage purposes.

S130 family uses superior quality, preselected single-level cell (SLC) 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.

S130 family offers outstanding performance and reliability, ideal for extreme applications in mission critical environments. Factory Automation, Transportation, Networking and Video Surveillance all benefit from this superior read/write endurance and data retention.

### 1.2 Feature

- Compliant with ATA command set
- SLC NAND flash memory
- Capacity: 128MB ~ 4GB
- 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.

### 1.3 Product Appearance & Models

#### Cervoz Industrial PATA Disk 44pin Horizontal Left Module S130



| S130 Family<br>Standard Temp. (0°C ~ 70°C)<br>Model No. | S130 Family<br>Wide Temp. (-40°C ~ 85°C)<br>Model No. | Capacity |
|---|---|----------|
| CIE-4LS130TCT128MS                                      | CIE-4LS130TCT128MW                                    | 128MB    |
| CIE-4LS130TDT256MS                                      | CIE-4LS130TDT256MW                                    | 256MB    |
| CIE-4LS130TET512MS                                      | CIE-4LS130TET512MW                                    | 512MB    |
| CIE-4LS130TFT001GS                                      | CIE-4LS130TFT001GW                                    | 1GB      |
| CIE-4LS130TGT002GS                                      | CIE-4LS130TGT002GW                                    | 2GB      |
| CIE-4LS130TGT004GS                                      | CIE-4LS130TGT004GW                                    | 4GB      |

**Please Note:**

Since certain storage capacity has to be reserved for firmware and controller management purposes; the physical capacity of the PATA flash module will be approximately 90% 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.

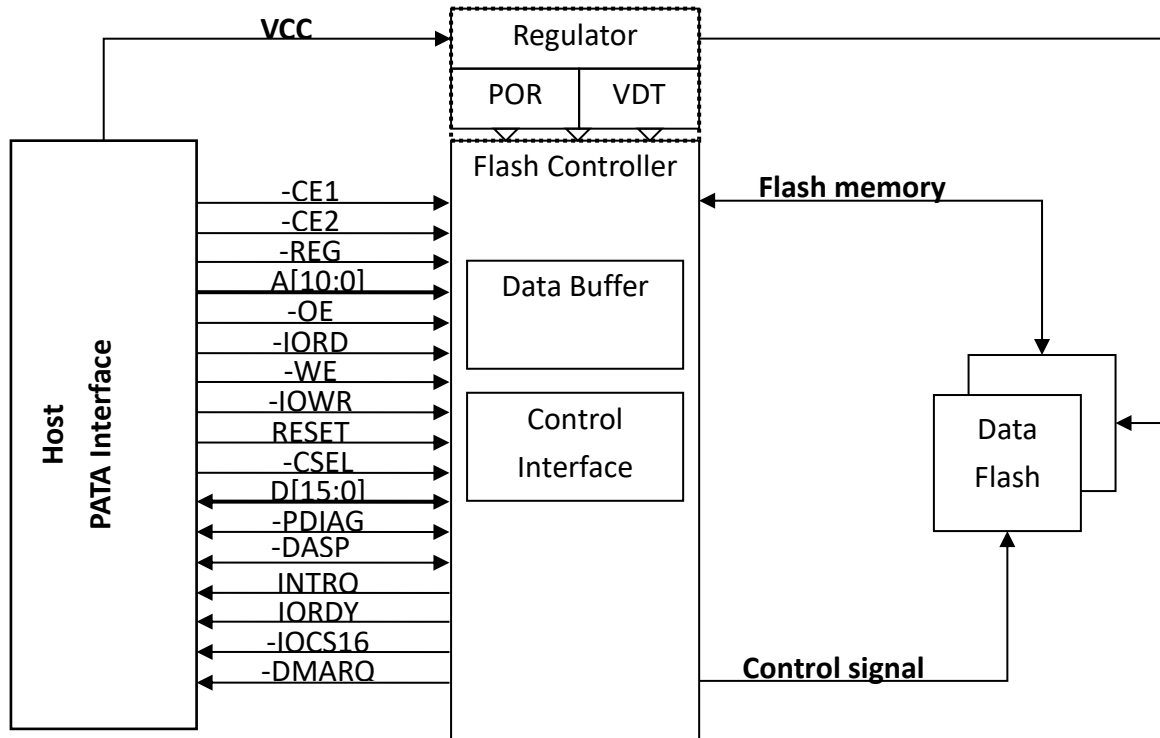
## 2. Product Specifications

### 2.1 General Specifications

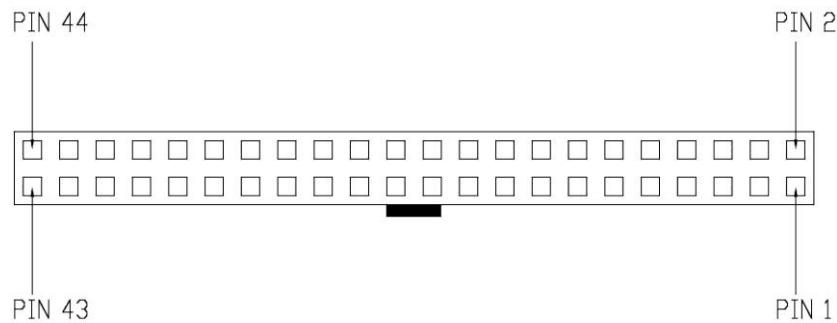
|                               |  |
|-------------------------------|--|
| <b>Form Factor</b>            | PATA Disk 44pin Horizontal Left  |
| <b>Interface</b>              | PATA   |
| <b>Connector</b>              | PATA (44pin)   |
| <b>NAND Flash Type</b>        | SLC  |
| <b>Capacity</b>               | 128MB/256MB/512MB/1GB/2GB/4GB  |
| <b>Sequential Read</b>        | up to 43MB/s   |
| <b>Sequential Write</b>       | up to 37MB/s   |
| <b>ECC Scheme</b>             | up to 24bits / 1K Byte   |
| <b>MTBF</b>                   | >3,000,000 hours   |
| <b>TeraByte Written (TBW)</b> | 128MB : 2<br>256MB : 5<br>512MB : 10<br>1GB : 20<br>2GB : 39<br>4GB : 78 |
| <b>Low Power Management</b>   | DIPM/HIPM mode   |
| <b>Supply Voltage</b>         | 5V DC +/-5%  |
| <b>Power Consumption</b>      | Active mode: <300mW<br>Idle mode: < 11.5mW                               |
| <b>Dimension (LxWxH)</b>      | 44.00*28.00*5.80mm   |

## 2.2 Electronic Specifications

### 2.2.1 Block Diagram



## 2.2.2 Pin Assignment



| Pin | Pin Name | Pin | Pin Name |
|-----|----------|-----|----------|
| 1   | RESET-   | 2   | Ground   |
| 3   | DD7      | 4   | DD8      |
| 5   | DD6      | 6   | DD9      |
| 7   | DD5      | 8   | DD10     |
| 9   | DD4      | 10  | DD11     |
| 11  | DD3      | 12  | DD12     |
| 13  | DD2      | 14  | DD13     |
| 15  | DD1      | 16  | DD14     |
| 17  | DD0      | 18  | DD15     |
| 19  | Ground   | 20  | Vcc      |
| 21  | DMARQ    | 22  | Ground   |
| 23  | DIOW-    | 24  | Ground   |
| 25  | DIOR-    | 26  | Ground   |
| 27  | IORDY    | 28  | CSEL     |
| 29  | DMACK-   | 30  | Ground   |
| 31  | INTRQ    | 32  | Ground   |
| 33  | DA1      | 34  | PDIAG-   |
| 35  | DA0      | 36  | DA2      |
| 37  | CS0-     | 38  | CS1-     |
| 39  | DASP-    | 40  | Ground   |
| 41  | Vcc      | 42  | Vcc      |
| 43  | Ground   | 44  | reserved |

### Notes:

1. Signals marked with an asterisk are required for 16-bit access, not required when installed in 8-bit systems.
2. Should be grounded by the host.

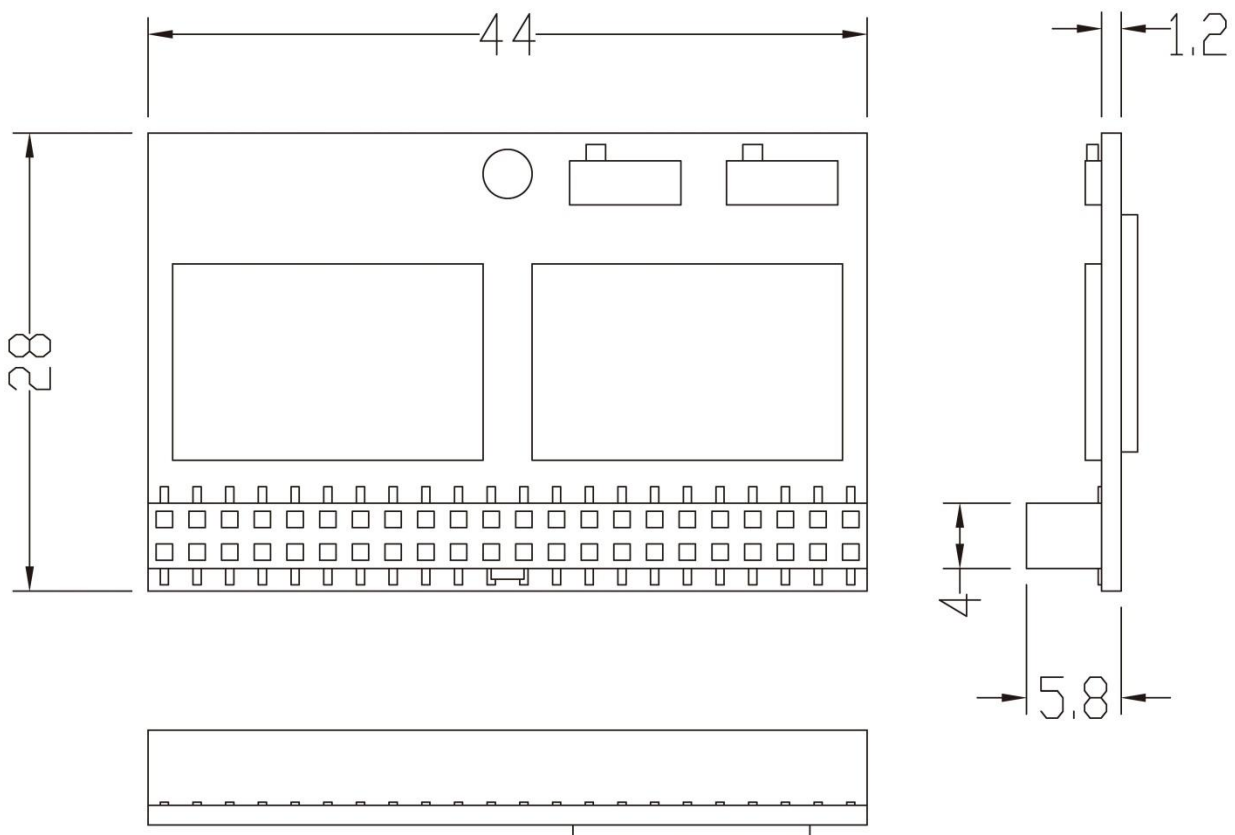


### 2.3 Environmental Specifications

| 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>   | Non-Operating                   | 20G, 10Hz~2000Hz       |
| <b>Shock</b>       | Non-Operating                   | 1500G, 0.5ms           |

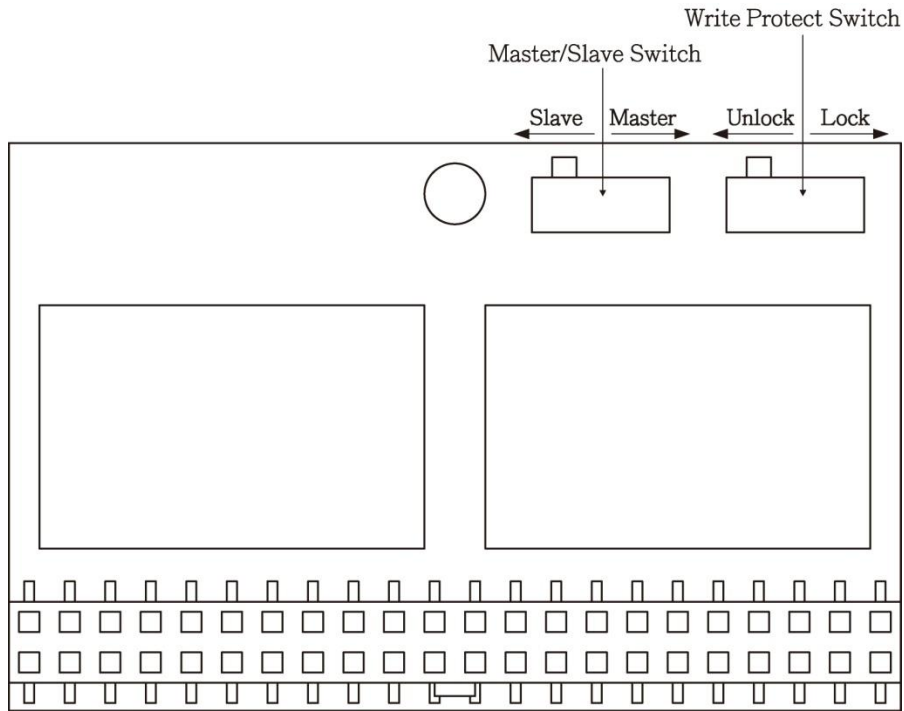
### 2.4 Mechanical Specifications

| Type        | Value                           |
|-------------|---------------------------------|
| Form Factor | PATA Disk 44pin Horizontal Left |
| Length      | 44.00mm +/-0.15mm               |
| Width       | 28.00mm +/-0.10mm               |
| Thickness   | 5.80mm +/-0.10mm                |





Write Protect and Master/Slave Instructions



### 3. Supported Command

#### 3.1 List of Command Sets

| Code       | Description                 | Code       | Description               |
|------------|-----------------------------|------------|---------------------------|
| 00h        | NOP                         | CDh        | Write Multiple w/o Erase  |
| 03h        | Request Sense               | E0 or 94h  | Standby Immediate         |
| 1Xh        | Recalibrate                 | E1h or 95h | Idle Immediate            |
| 20h or 21h | Read Sector(s)              | E2 or 96h  | Standby                   |
| 30h or 31h | Write Sector(s)             | E3h or 97h | Idle                      |
| 38h        | Write Sector(s) w/o Erase   | E4h        | Read Buffer               |
| 3Ch        | Write Verify                | E5 or 98h  | Check Power Mode          |
| 40h or 41h | Read Verify Sector(s)       | E6h or 99h | Set Sleep Mode            |
| 50h        | Format Track                | E8h        | Write Buffer              |
| 7Xh        | Seek                        | Ech        | Identify Device           |
| 87h        | Translate Sector            | EFh        | Set Feature               |
| 90h        | Execute Drive Diagnostic    | F1h        | Security Set Password     |
| 91h        | Initialize Drive Parameters | F2h        | Security Unlock           |
| C0h        | Erase Sector                | F3h        | Security Erase Prepare    |
| C4h        | Read Multiple               | F4h        | Security Erase Unit       |
| C5h        | Write Multiple              | F5h        | Security Freeze Lock      |
| C6h        | Set Multiple Mode           | F5h        | Wear Level                |
| C8h        | Read DMA                    | F6h        | Security Disable Password |
| Cah        | Write DMA                   |            |                           |

#### 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 | Die Package | Module Capacity | Operating Temp. |
| XXX          | - | XX          | X              | XXX   | X           | X              | X           | XXXX            | X               |

#### 2. 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        |
| 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. 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) |