

Cervoz Industrial SSD

U.3 NVMe

Enterprise Grade

Titan Series (eTLC NAND)

T443 Family

Product Datasheet





Revision History

Date	Revision	Description
2024.05.20	1.0	First Released

Table of Contents

1. Product Overview.....	4
1.1 Introduction.....	4
1.2 Features.....	4
1.3 Product Appearance & Models.....	5
2. Product Specifications.....	6
2.1 General Specifications.....	6
2.2 Performance.....	7
2.3 Electronic Specifications.....	7
2.3.1 Block Diagram.....	7
2.3.2 Pin Assignment.....	8-10
2.4 Environmental Specifications.....	10
2.5 Mechanical Specifications.....	11
3. Supported Command.....	11
3.1 List of Command Sets.....	11~13
4. Part No. Decoder.....	14
4.1 Part No. Decoder.....	14~15

1. Product Overview

1.1 Introduction

As artificial intelligence, cloud computing, big data, and the Internet of Things continue to advance rapidly, there is an unprecedented surge in demand for extensive data processing across diverse industries. In line with this, Cervoz unveils its T443 family of enterprise grade SSDs, designed specifically for handling massive data volumes with high stability and efficiency.

Cervoz U.3 Enterprise SSD T443 family is a high capacity Solid State Disk product that is in compliance with the 2.5inch U.3 form factor and PCIe Gen 4x4 standards.

T443 family uses enterprise-grade 3D TLC NAND Flash (eTLC). Cervoz's firmware builds in a powerful ECC algorithm call Low-Density Parity Check (LDPC) decoding and End-to-End Data Protection to improve data reliability. Meanwhile, T443 family has a very unique function named Powerguard. The purpose of Powerguard is to protect data loss while encountering an improper power failure. In additional, T443 family with heat dissipation design on the case, keeping the SSD cooler to effectively and achieve the best performance. This product includes various capacities to choose from.

1.2 Features

- Compliant with PCIe Gen4x4 interface (backward compatible to PCIe Gen 3, Gen 2 and Gen 1)
- Compliance:
 - NVMe 1.4
 - PCI Express Base 4.0
- 3D TLC NAND flash (eTLC)
- Capacity: 1920GB ~ 7680GB
- Powerguard Function (Power Loss Protection)
- Support AES 256-bit Encryption
- End-to-End data protection
- Dynamic Thermal throttling
- Heat dissipation design on the case
- Operating as boot disk
- Static and dynamic wear leveling
- Bad block management
- S.M.A.R.T. & TRIM command
- RoHS compliant

1.3 Product Appearance & Models

Cervoz U.3 Enterprise SSD T443



T443 Family Standard Temp. (0°C ~ 70°C) Model No.	Capacity
CIS-U3T443ONU1920S	1920GB
CIS-U3T443ONU3840S	3840GB
CIS-U3T443OOU7680S	7680GB

Please Note:

Since certain storage capacity has to be reserved for firmware and controller management purposes; the physical capacity of the flash module will be approximately 93% 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 x 15mm
Interface	PCIe Gen4x4 (backward compatible to PCIe Gen 3, Gen 2 and Gen 1)
Connector	U.3 (SFF-TA-1001)
NAND Flash Type	TLC NAND (eTLC)
Capacity	1920GB/3840GB/7680GB
Sequential Read	up to 7,000MB/s
Sequential Write	up to 6,800MB/s
DRAM Buffer	Included
ECC Scheme	Applies the LDPC (Low Density Parity Check) of ECC algorithm
MTBF	>2,500,000 hours
Terabyte Written (TBW)	1920GB : 3504 3840GB : 7008 7680GB : 14016
Drive Write Per Day (DWPD)	1
Supply Voltage	+12V DC \pm 10%
Power Consumption	Active mode: < 19.1W Idle mode: < 5.8W
Dimension (L x W x H)	100.00*69.85*14.65mm
Weight	205 \pm 1g

2.2 Performance

The performance was measured with below PC configuration:

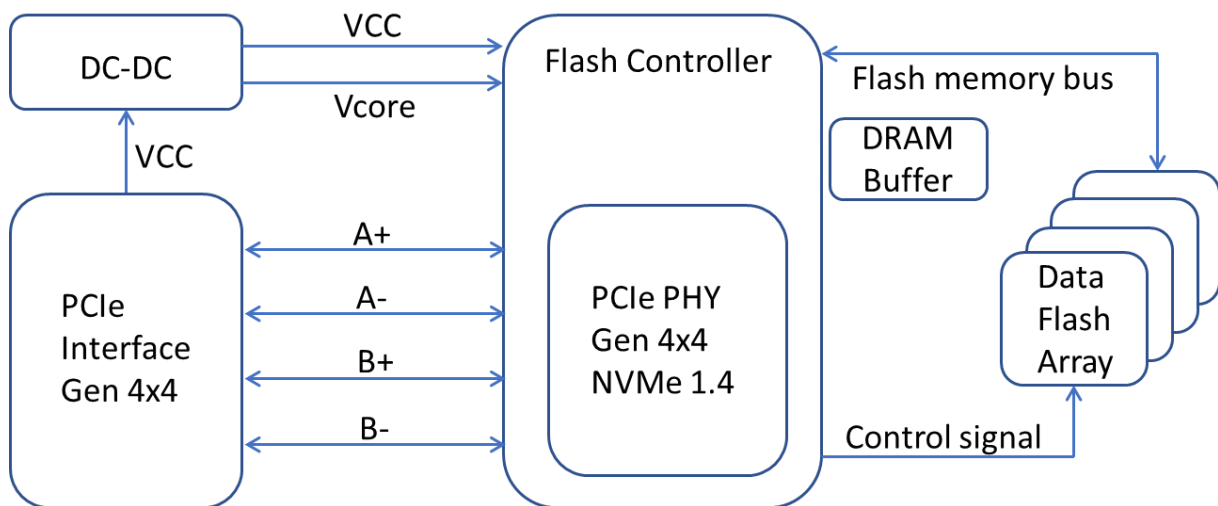
- Platform: GIGABYTE Z690 AORUS ULTRA
- RAM: Cervoz CIR-S5DUSB4816G (DDR5 16G 4800MHz)
- Operation Systems: Win10 64bit
- Testing Utility: Crystal Disk Mark v8.0.4 x64 and IOMeter, 1GB range
- PCIe Gen4 performance

Capacity	1920GB	3840GB	7680GB
Sequential Read (Q32T1)	7,000 MB/s	7,000 MB/s	7,000 MB/s
Sequential Write (Q32T1)	3,500 MB/s	6,600 MB/s	6,800 MB/s
4KB Random Read (Q128T16)	1,600K IOPS	1,600K IOPS	1,600K IOPS
4KB Random Write (Q128T16)	95K IOPS	170K IOPS	180K IOPS

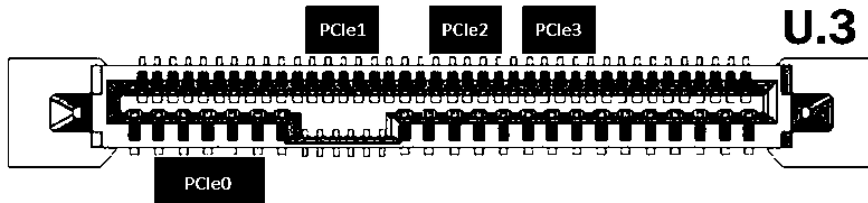
Actual performance may vary depending on use conditions and environment

2.3 Electronic Specifications

2.3.1 Block Diagram



2.3.2 Pin Assignment



Pin No.	Function	Type	Description
P1	WAKE#	Input	Reserved
P2	Reserved	Reserved	Reserved
P3	PWRDIS	Output	Power disable
P4	IfDet#	Input	Interface Type Detect
P5	Ground	Ground	Ground
P6	Ground	Ground	Ground
P7	+5V	Power	Reserved
P8	+5V	Power	Reserved
P9	+5V	Power	Reserved
P10	PRSNT#	Input	Presence detect
P11	Activity#	Input	Activity indicator
P12	Ground	Ground	Ground
P13	+12V Precharge	Power	+12V Precharge power
P14	+12V	Power	+12V power
P15	+12V	Power	+12V power
SG1	Ground	Ground	Ground
SG2	Ground	Ground	Ground
S1	Ground	Ground	Ground
S2	U.3 TX p0	Diff-Pair	Transmitter differential pair, U.3 Lane 0
S3	U.3 TX n0	Diff-Pair	Transmitter differential pair, U.3 Lane 0
S4	Ground	Ground	Ground
S5	U.3 RX n0	Diff-Pair	Receiver differential pair, U.3 Lane 0
S6	U.3 RX p0	Diff-Pair	Receiver differential pair, U.3 Lane 0
S7	Ground	Ground	Ground
S8	Ground	Ground	Ground
S9	U.3 TX p1	Diff-Pair	Transmitter differential pair, U.3 Lane 1
S10	U.3 TX n1	Diff-Pair	Transmitter differential pair, U.3 Lane 1

Pin No.	Function	Type	Description
S11	Ground	Ground	Ground
S12	U.3 RX n1	Diff-Pair	Receiver differential pair, U.3 Lane 1
S13	U.3 RX p1	Diff-Pair	Receiver differential pair, U.3 Lane 1
S14	Ground	Ground	Ground
S15	HPT0	Output	Host port type
S16	Ground	Ground	Ground
S17	U.3 TX p2	Diff-Pair	Transmitter differential pair, U.3 Lane 2
S18	U.3 TX n2	Diff-Pair	Transmitter differential pair, U.3 Lane 2
S19	Ground	Ground	Ground
S20	U.3 RX n2	Diff-Pair	Receiver differential pair, U.3 Lane 2
S21	U.3 RX p2	Diff-Pair	Receiver differential pair, U.3 Lane 2
S22	Ground	Ground	Ground
S23	U.3 TX p3	Diff-Pair	Transmitter differential pair, U.3 Lane 3
S24	U.3 TX n3	Diff-Pair	Transmitter differential pair, U.3 Lane 3
S25	Ground	Ground	Ground
S26	U.3 RX n3	Diff-Pair	Receiver differential pair, U.3 Lane 3
S27	U.3 RX p3	Diff-Pair	Receiver differential pair, U.3 Lane 3
S28	Ground	Ground	Ground
E1	REFCLKB+	Diff-Pair	Reference clock (differential pair) for second X2 port
E2	REFCLKB-	Diff-Pair	Reference clock (differential pair) for second X2 port
E3	+3.3 Vaux	Power	3.3 V auxiliary power
E4	CLKREQ#/PERSTB#	Bi-dir	Clock request/Fundamental reset for second x2 port
E5	PERST#	Output	Fundamental reset (if dual-port enabled, first X2 port)
E6	IFDet2#	Input	Interface Type Detect
E7	REFCLK+	Diff-Pair	Reference clock (if dual-port enabled, first X2 port)
E8	REFCLK-	Diff-Pair	Reference clock (if dual-port enabled, first X2 port)
E9	Ground	Ground	Ground
E12	Ground	Diff-Pair	Ground
E15	Ground	Ground	Ground
E16	HPT1	Output	Host port type

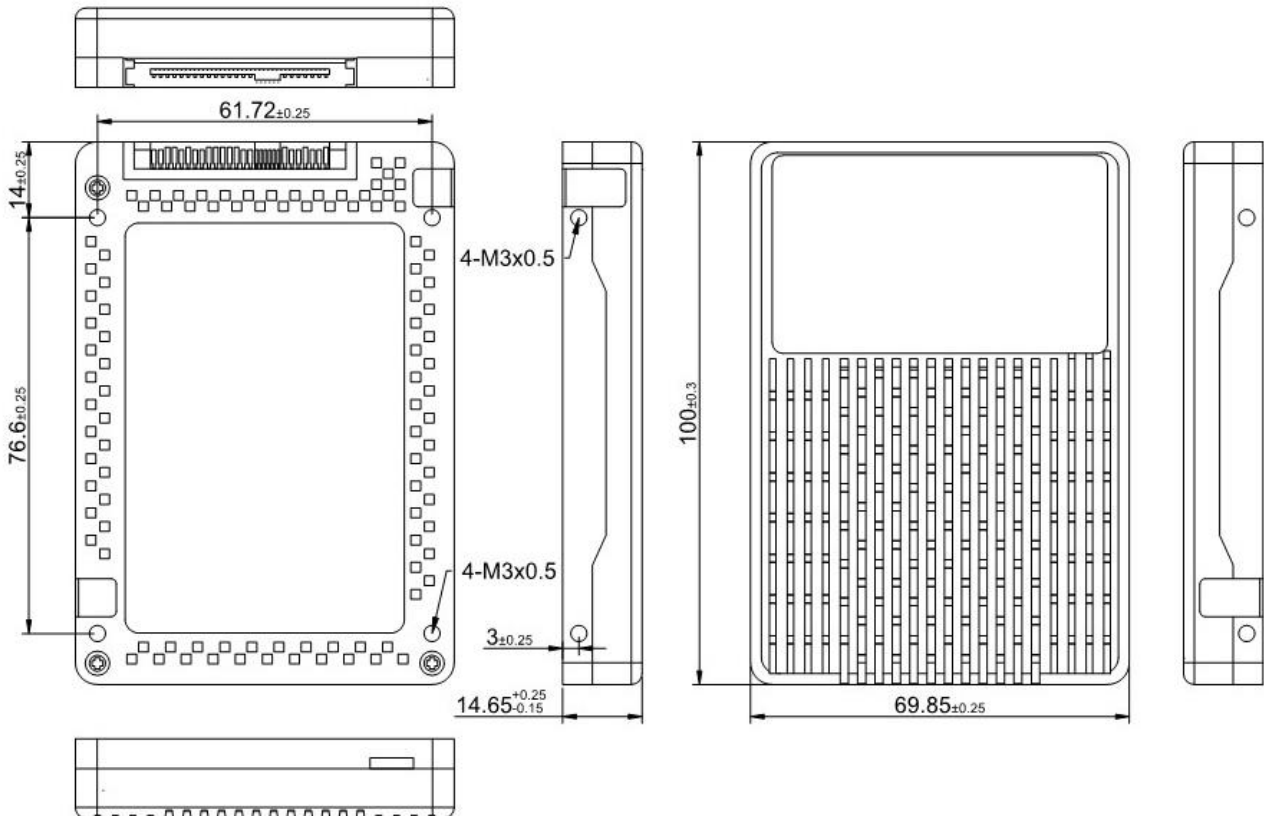
Pin No.	Function	Type	Description
E19	Ground	Ground	Ground
E22	Ground	Ground	Ground
E23	SMCLK	Bi-Dir	SMBus (System Management Bus) clock
E24	SMDAT	Bi-Dir	SMBus (System Management Bus) data
E25	DualPortEn#	Output	Dual-port Enable

2.4 Environmental Specifications

Type		Value
Temperature	Standard Temperature Operating:	0°C~70°C
	Standard Temperature Storage:	-40°C~85°C
Humidity	Operating & Storage	5~95%, Non-Condensing
Vibration	Operating	2.17G, 200Hz~ 2000Hz
	Non-Operating	16.3G, 10Hz~2000Hz 3G, 2Hz~5Hz~500Hz
Shock	Operating	500G, 2ms 1000G, 1000ms
	Non-Operating	500G, 2ms 1000G, 1000ms
Altitude	Operating	0 ~ 18000 feet
	Non-Operating	0 ~ 40000 feet

2.5 Mechanical Specifications

Type	Value
Form Factor	2.5inch
Length	100.00 mm \pm 0.3 mm
Width	69.85 mm \pm 0.25 mm
Thickness	14.65 mm $+0.25 / -0.15$ mm



3. Supported Command

3.1 List of Command Sets

Admin Commands		
Code	O/M	Description
00h	M	Delete I/O Submission Queue
01h	M	Create I/O Submission Queue
02h	M	Get Log Page
04h	M	Delete I/O Completion Queue
05h	M	Create I/O Completion Queue
06h	M	Identify
08h	M	Abort
09h	M	Set Features



0Ah	M	Get Features
0Ch	M	Asynchronous Event Request
0Dh	O	Namespace Management
10h	O	Firmware Commit
11h	O	Firmware Image Download
14h	O	Device Self-test
15h	O	Namespace Attachment
1Dh	O	NVMe-MI Send
1Eh	O	NVMe-MI Receive
80h	O	Format NVM
81h	O	Security Send
82h	O	Security Receive
84h	O	Sanitize

I/O Commands

Code	O/M	Description
00h	M	Flush
01h	M	Write
02h	M	Read
04h	O	Write Uncorrectable
05h	O	Compare
08h	O	Write Zeroes
09h	O	Dataset Management
0Ch	O	Verify
0Dh	O	Reservation Register
0Eh	O	Reservation Report
11h	O	Reservation Acquire
15h	O	Reservation Release

Set Feature Commands

Code	O/M	Description
01h	M	Arbitration
02h	M	Power Management
04h	M	Temperature Threshold
05h	M	Error Recovery
06h	O	Volatile Write Cache
07h	M	Number of Queues



08h	M	Interrupt Coalescing
09h	M	Interrupt Vector Configuration
0Ah	M	Write Atomicity Normal
0Bh	M	Asynchronous Event Configuration
0Eh	O	Timestamp
0Fh	O	Keep Alive Timer
17h	O	Sanitize Config
7Eh	M	Controller Metadata (NVMe MI)
7Fh	M	Namespace Metadata (NVMe MI)
81h	O	Host Identifier
82h	O	Reservation Notification Mask
83h	O	Reservation Persistence

Get Log Page Commands

Code	O/M	Description
01h	M	Error Information
02h	M	SMART / Health Information
03h	M	Firmware Slot Information
04h	O	Changed Namespace List
05h	O	Commands Supported and Effects
06h	O	Device Self-test
07h	O	Telemetry Host-Initiated
08h	O	Telemetry Controller-Initiated
0Dh	O	Persistent Event Log
80h	O	Reservation Notification
81h	O	Sanitize Status

NVMe Management Interface Command

Code	O/M	Description
00h	M	Read NVMe-MI Data Structure
01h	M	NVM Subsystem Health Status Poll
02h	M	Controller Health Status Poll
03h	M	Configuration Set
04h	M	Configuration Get
05h	M	VPD Read
06h	M	VPD Write
07h	M	Reset

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
U3	U.3
CF	CompactFlash
CA	CFast
MS	mSATA
HM	Half Size mSATA
HS	Half Slim
M3	M.2 2230
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)
T	Titan Series(TLC)

4. Cervoz Family Code

Bus and Internal Control for Cervoz Product Families

5. Flash Brand

M	Micron
K	Kioxia
O	OEM NAND Flash



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
N	2Tb
O	4Tb

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
240G	240GB
256G	256GB
480G	480GB
512G	512GB
960G	960GB
001T	1TB
1920	1.92TB
002T	2TB
3840	3.84TB
004T	4TB
7680	7.68TB

9. Operating Temperature

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