Introducing the OCZ Z-Drive 4500 Solid State Drive Series

Next Generation Enterprise-Class Performance and Reliability
March 2014

A Toshiba Group Company
OCZ’s new Z-Drive 4500 PCIe SSD Series will be formally announced to the public on:

**Tuesday March 4th, 2014 at 8:00 am ET**

OCZ requests that the media honor this embargo date and time

Thank you in advance!
About OCZ Storage Solutions

- OCZ Storage Solutions is a Toshiba Group Company
- The only fully-integrated SSD provider solely focused on SSD products
- Industry-leading solid-state storage that addresses client and enterprise storage challenges

Our solutions:
- Offer intelligent and optimized approaches to how data is captured, accessed, and leveraged
- Are designed with an application in mind, enabling us to meet specific demands
A Strong, Fully Integrated Organization

Robust engineering team leverages innovative IP to design and develop differentiated flash storage solutions:

- Barefoot Controller/FW
- Intrepid Firmware
- Z-Drive VCA Technology
- XL Software Suite

As a Toshiba subsidiary, OCZ has direct access to NAND flash enabling:

- Competitive Pricing
- Early Access to Next Gen NAND
- Better Product Availability
- Superior Optimization
Global Presence, Global Innovation

- Global footprint and support network
- Robust in-house R&D team
- Sales / marketing offices in each major region
Product Line Breakdown

PCle

SATA

StoragePro XL Management Software

SOFTWARE-DEFINED

ENTERPRISE

ZD-XL SQL

ENTERPRISE

VXL VMware

ENTERPRISE

Z-Drive 4500

ENTERPRISE

Intrepid 3000

ENTERPRISE

Deneva 2

ENTERPRISE

WORKSTATION

Revo 350

ENTERPRISE

ENTHUSIAST

Vector 150

ENTERPRISE

PERFORMANCE

Vertex 460

*RevoDrive 350 coming in Q2
Data centers have evolved.

So has the OCZ Z-Drive.
The All-New Z-Drive 4500 PCIe Solution

The new Z-Drive 4500 features an array of updates and improvements over the Z-Drive R4, delivering a superior enterprise solution.

- Ground-up, redesigned drivers for ultimate performance efficiency
- Improved thermal design caters to the modern data center
- New form factor addresses wider range of platforms
- Superior manageability and performance with included software suite
Optimized Functionality & Feature-Set

The New Z-Drive 4500
- Full Height-Half Length
- In-house Flash
- Thermal Throttling
- Temperature-cool casing
- Optimized Drivers
- WXL Support
- 5 Year Warranty

Z-Drive R4
- Full Height-Full Length
- Up to 3.2TB
- PCIe Gen2 x8
- VCA
- WXL Support
- 3 Year Warranty
Z-Drive 4500 = Proven Architecture

- The new Z-Drive is built using proven technology with the added benefit of utilizing in-house Toshiba flash memory for optimal product availability.

- Features integrated internal storage controller
- Includes eight (8) LSI SF-2582 processors
- Toshiba 19nm MLC NAND Flash
- Virtualized Controller Architecture™ (VCA)
Virtualized Controller Architecture

- Implements OCZ’s Virtualized Controller Architecture™ (VCA) identical to the Z-Drive R4 Series
  
- Effectively makes the 8 controllers of the Z-Drive 4500 appear and act as a single drive to the host system

- Delivers leading MLC sustained performance:
  
  Read Bandwidth: up to 2,900 MB/s  
  Write Bandwidth: up to 2,200 MB/s  
  4K Random Read: up to 252,000 IOPS  
  4K Random Write: up to 76,000 IOPS
The Leading Performance of OCZ’s VCA Architecture

Write Saturation 128k Sequential Workloads

SQL Server Logs 8k Workload 100:0 Seq/Rdm; 0:100 Reads/Writes

Video on Demand Server 512k Workload 100:0 Seq/Rdm; 0:100 Reads/Writes

Archive Server 2MB Workload 05:95 Seq/Rdm; 55:45 Reads/Writes

Blind survey results from Calypso PCIe SSD performance tests
Evolving with the Data Center

Yesterday’s Data Center

Expensive, Inefficient Cooling

Today’s Data Center

Precision A/C Units

Cold Aisle

Hot Aisle

Raised Floor

Perforated Tiles
Evolving with Data Center Thermals

Gone are the days of expensive, inefficient air-conditioned data centers

- Today’s data centers require hardware to perform efficiently in warmer server environments (e.g., hot/cold aisle approach) to decrease Op-Ex

- New Z-Drive 4500 thermal features enable it to be a part of aggressive TCO (Total Cost of Ownership) models:
  
  • New temperature sensing measures onboard heat to ensure that operating temperatures stay below maximum limit
  
  • New thermal-throttling engages if a high temperature condition occurs to protect the drive enabling it to operate under adverse temperature variances
  
  • New attractive outer casing provides a more stable and cooler thermal SSD environment
Included WXL Caching Software

- Each Z-Drive 4500 comes with integrated Windows Accelerator (WXL) Software
- Enables efficient use of the Z-Drive 4500 as a flash volume, a flash cache, or both concurrently
- Performs statistical ‘out-of-band’ processing to selectively determine what data to cache
- Includes advanced cache warm-up and analysis scheduler for optimal flash usage
- Improves performance and latency on SAN and DAS systems making them more available for other applications
VXL Virtualization Software Support

- Works with OCZ's VXL Virtualization Software to optimize virtualized environments by ensuring critical data is available on flash for use by VMs.

- Distributes flash resources on-demand across VMs to accelerate application performance:
  - Makes sure no VM inefficiently occupies flash
  - Utilizes Z-Drive 4500's flash cache optimally at all times regardless of VM quantity

- Reduces data traffic to and from the SAN.

- Delivers a SAN-less software-defined storage system.
**Enterprise-Grade Data Reliability**

**Power Loss Data Protection**
Full in-flight data protection in the event of a sudden power failure ensuring in-progress write operations complete and data is properly stored.

**Enhanced Data Reliability**
Advanced ECC uses BCH codes to detect and correct a limited number of bit errors ‘on-the-fly’

**End-to-End Data Path Protection**
Performs data integrity checks at every juncture where data is transmitted and received ensuring that corrupted data is detected and not propagated.

**Dependable Data Redundancy**
Internal SSD RAID functionality provides additional safeguards to supplement traditional ECC algorithms, and further reduce uncorrectable bit error rates.
Targeted Z-Drive 4500 Applications

- High Performance Computing (HPC)
- Virtual Desktop Infrastructure (VDI)
- Web 2.0 Server / Web Browsing
- Media Streaming
- Microsoft Exchange Server
- Databases: Data Warehousing, OLTP, OLAP
- Virtualization (Server/Client)
The Z-Drive 4500 is available in solely in a full height, half length form factor in 3 capacity offerings:

- 800GB: 680 TBW
- 1600GB / 1.6TB: 1300 TBW
- 3200GB / 3.2TB: 2500 TBW

- Offers competitive endurance ratings at up to 2500 Terabytes Written (TBW) for 5 years.
Z-Drive 4500 Summary

- Leading sustained performance for MLC-based PCIe enterprise SSDs
- 19nm NAND flash in a FH-HL design
- Temperature sensing and thermal throttling
- ‘Temperature-cool’ casing
- Integrated Windows Acceleration (WXL) Software
- Support for VXL Virtualization Software
- Data protection: power loss & end-to-end
- 800GB, 1.6TB and 3.2TB usable capacities
Thank you! Questions?
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