Data Center DC500 Enterprise Solid-State Drives (SSDs)

Performance, Reliability and Consistency

Data Center 500 Series
Kingston's Data Center 500 (DC500R / DC500M) Series of solid-state drives are high performance 6Gbps SATA SSDs using the latest 3D TLC NAND, designed for Read Centric and Mixed-Use server workloads. They implement Kingston's strict QoS requirements to ensure predictable random I/O performance as well as predictable low latencies over a wide range of read and write workloads. They can increase productivities within AI, machine learning, big data analytics, cloud computing, software-defined storage, operational databases (ODB), database applications, and data warehousing. Capacities from 480GB, 960GB, 1.92TB, 3.84TB[1]

Enterprise Data Center SSD
Delivering on business demands for 24/7 uptime and reliability, Kingston Enterprise SSDs offer performance storage that combines performance predictability as well as rigorously tested reliability. Kingston's DC500 Series SSDs offer features that enable data centers to select the most cost effective SSD for their workload(s). Businesses require results as they deliver on products, solutions and service level agreements (SLA's). Kingston's DC500 Series SSDs are designed to deliver on these expectations.

DC500R: Read-centric SSD
DC500R is a highly optimized SSD designed for read-centric workloads enabling data centers to select SSDs tailored for workloads without overspending on more expensive write intensive SSDs. It delivers I/O speeds and response times (latency) that a data center can deploy with confidence to ensure high levels of performance in the working application and downstream at the user interface. These are typically defined by applications requiring real-time results. Serving large amounts of data, delivering responsive results from a variety of databases and web-based applications can leverage the receptive performance of the DC500R.

DC500M: Mixed-use SSD
DC500M is powerful SSD designed for mixed-use workload applications where the demand has a more balanced mix of read and write operations. It delivers greater write endurance over a wide range of workloads all while maintaining the strict performance consistency requirements designed into all of Kingston's Data center SSDs. Data centers hosting databases and various web-based application=s can leverage the predictable I/O and latency performance while controlling infrastructure costs.

End-to-end Protection
The DC500 Series SSDs incorporate end-to-end data path protection to help guarantee that all user data transferred into the SSD is protected against transient errors. DC500R / DC500M both include on-board (PLP) power loss protection (via power capacitors and firmware). This ensures data-in-flight is written to the NAND Flash memory in the event of unexpected power loss. Additionally, PLP ensures that the drives mapping table (FTL) is updated prior to power being removed from the drive. These power loss safeguards reduce the chance for data loss and ensure that the drive will successfully re-initialize on the next power-up of the system.

Quality of Service (QoS)
The DC500 Series delivers on QoS ([2],[3],[4]) with consistency, predictability of latency (response time) and IOPS (IOs Per Second) performance while servicing balanced read and write workloads. Performance predictability is essential for web hosting applications that must deliver on SLA's promised to customers. The DC500 series efficiency produces the reliability for web server applications requiring read centric drives or mixed-use intensive workloads where uptime is mission critical.

Application use cases
Designed for service providers running a wide range of customer applications including:
- Virtualization
- High-speed databases
- High bandwidth media streaming
- SQL server reporting services (SSRS)
- SAP
- BI, ERP, CRM, GL, OLAP, OLTP, ERM and EDW workloads
- Cloud Service Providers

Both DC500R and DC500M feature enterprise-class reliability with end-to-end data path protection, SMART health monitoring and strong ECC. They are backed by legendary pre and post-sales support along with a five-year limited warranty.[7]

› Predictable random I/O performance and latencies over a wide range of workloads

› Read-centric design for performance in high read intensive workloads (DC500R)

› Mixed-use design for balanced performance in high read / write intensive workloads (DC500M)

› Configurable over-provisioning

› On-board (PLP) power loss

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FEATURES/ BENEFITS

> **Optimized for read-intensive applications (DC500R)** — Responsiveness from low latency and consistent I/O performance delivers businesses the QoS needed in demanding read-centric workloads.

> **Optimized for mixed-use applications (DC500M)** — An exceptional balance of consistent I/O delivery and high read and write IOPS performance to manage a wide range of transactional workloads.

> **Reduce application latencies** — Data center's hosting databases and various web-based applications can leverage the predictable I/O and latency performance.

> **Data Integrity Protection** — EECC protection with advanced read/disturb management safeguards against data corruption for end-to-end data protection.

> **On-board (PLP) Power Loss Protection** — Reduce the possibility of data loss and/or corruption on ungraceful power-fails via power capacitors and firmware.

SPECIFICATIONS

> **Form Factor** 2.5 Inch

> **Interface** SATA Rev. 3.0 (6Gb/s) – with backwards compatibility to SATA Rev. 2.0 (3Gb/s)

> **Capacities[1]** 480GB, 960GB, 1.92TB, 3.84TB

> **NAND** 3D TLC

> **Self-Encrypting Drive (SED)** AES 256-bit Encryption

> **Sequential Read/Write: (DC500R)**
480GB – 555MBs/500MBs   960GB – 555MBs/525MBs
1.92TB – 555MBs/525MBs   3.84TB – 555MBs/520MBs

> **Steady-State 4k Read/Write: (DC500R)**
480GB – 98,000/12,000 IOPS   960GB – 98,000/20,000 IOPS
1.92TB – 98,000/24,000 IOPS   3.84TB – 98,000/28,000 IOPS

> **Sequential Read/Write: (DC500M)**
480GB – 555MBs/520MBs   960GB – 555MBs/520MBs
1.92TB – 555MBs/520MBs   3.84TB – 555MBs/520MBs

> **Steady-State 4k Read/Write: (DC500M)**
480GB – 98,000/58,000 IOPS   960GB – 98,000/70,000 IOPS
1.92TB – 98,000/75,000 IOPS   3.84TB – 98,000/75,000 IOPS

> **Quality of Service (Latency)[2, 3, 4]**- TYP Read/Write: <500 μs / <2 ms

> **Hot-Plug Capable**

> **Static and Dynamic Wear Leveling**

> **Enterprise SMART tools** Reliability tracking, usage statistics, life remaining, wear leveling, temperature

> **Power Loss Protection** Tantalum Capacitors

> **Endurance**
DC500R:
480GB — 438TBW [5] (0.5 DWPD) [6]   960GB — 876TBW [5] (0.5 DWPD) [6]
1.92TB — 1752TBW [5] (0.5 DWPD) [6]   3.84TB — 3504TBW [5] (0.5 DWPD) [6]
DC500M:
480GB – 1139TBW [5] (1.3 DWPD) [6]   960GB – 2278TBW [5] (1.3 DWPD) [6]
1.92TB – 4555TBW [5] (1.3 DWPD) [6]   3.84TB – 9110TBW [5] (1.3 DWPD) [6]

> **Power Consumption**
Idle: 1.56W   Average: 1.6W   Max Read: 1.8W   Max Write: 7.5W

> **Storage temperature** -40℃ ~ 85℃

> **Operating temperature** 0℃ ~ 70℃

> **Dimensions** 69.9mm x 100mm x 7mm

> **Weight** 92.34g

> **Vibration operating** 2.17G Peak (7–800Hz)

> **Vibration non-operating** 20G Peak (10–2000Hz)

> **MTBF** 2 million hours

> **Warranty/support[7]** Limited 5-year warranty with free technical support

PART NUMBERS

DC500R (Read-Centric)

SEDC500R/480G
SEDC500R/960G
SEDC500R/1920G
SEDC500R/3840G

DC500M (Mixed-Use)

SEDC500M/480G
SEDC500M/960G
SEDC500M/1920G
SEDC500M/3840G

The cryptographic functionalities, mentioned in the present section, are implemented in the firmware of the product. The cryptographic functions of the firmware can only be changed during the manufacturing process and cannot be changed by a regular user. The product is designed for installation by the user by following the step-by-step instruction from the installation user guide, supplied with the product, and, thereby, can be used without further substantial support of the supplier.

1. Some of the listed capacity on a Flash storage device is used for formatting and other functions and thus is not available for data storage. As such, the actual available capacity for data storage is less than what is listed on the products. For more information, go to Kingston's Flash Guide at kingston.com/flashguide.
2. Workload based on FIO, Random 4KB QD=1 workload, measured as the time taken for 99.9 percentile of commands to finish the round-trip from host to drive and to host.
3. Measurement taken once the workload has reached steady state but including all background activities required for normal operation and data reliability.
4. Based on 960GB capacity.
5. Total Bytes Written (TBW) is derived from the JEDEC Enterprise Workload (JESD219A).
6. Drives Writes Per Day (DWPD).
7. Limited warranty based on 5 years or SSD "Life Remaining" which can be found using the Kingston SSD Manager (kingston.com/SSDManager). A new, unused product will show a wear indicator value of one hundred (100), whereas a product that has reached its endurance limit of program erase cycles will show a wear indicator value of one (1). See kingston.com/wa for details.

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