

SSD 101

What is an SSD?

SSD is short for solid-state drive. An SSD is built using NAND Flash or DRAM memory chips in place of the platters and other mechanical mechanisms found in hard disk drives (HDDs).

How much faster is an SSD?

This is a difficult question to answer, as no two systems are the same and performance can be affected by the OS, any drivers loaded, applications in use, the speed and configuration of the processor and many other factors. Several test web sites and magazines have tested SSDs against HDDs and found SSDs to be much faster. For example, if we compared random read performance, SSDs are more than 20000% faster than high-performance HDDs.

It is worth noting that SSD drives are not affected by the physical limitations of hard drives. HDD platters are circular in design (like a CD) and data held at the centre of the circle is accessed at a slower rate than data on the edges. SSDs have a uniform access time across the entire drive. HDD performance also suffers from data fragmentation, whereas SSDs performance is not significantly impacted even if the data is not stored contiguously.

What are IOPS?

IOPS (Input/output Operations per Second) is the unit of measurement to show the number of transactions per second a storage device (HDD or SSD) is capable of handling. IOPS should not be confused with read/write speeds and pertain to server workloads.

What does wear-levelling mean? Is it important?

SSD drives use NAND Flash memory as the storage medium. One of the disadvantages of NAND Flash is that Flash cells will eventually wear out. To extend the memory's useable life, the SSD's memory controller employs various algorithms that spread the storage of data across all memory cells. This prevents any one cell or group of cells from being "over used." The use of wear-levelling technology is widespread and is very effective.

Why does my SSD have less capacity than some others?

To increase performance and endurance, some SSD manufacturers will reserve some of the drive capacity from the user area and dedicate it to the controller. This practice is known as over-provisioning (OP) and will increase the performance and longevity of the SSD. All current Kingston SSDs feature over-provisioning, and the capacities are 120GB, 240GB, 480GB, 960GB, 1.92TB and 3.84TB. [Learn more about over-provisioning.](#)

Will my SSD wear out or lose performance the longer I use it?

The NAND Flash used in USB, SD cards and SSDs all have endurance limits meaning one cannot continue to write to them forever. Flash based products will eventually wear out however with features like wear-levelling and over-provisioning an SSD will typically last longer than the system it was installed into. We measure drive endurance in TBW (Terabytes Written) and depending on drive capacity one can write hundreds of terabytes, up to petabytes. Performance of the SSD will remain the same throughout the life of the drive. [Learn more about TBW.](#)

What are SMART attributes?

S.M.A.R.T. stands for Self-Monitoring, Analysis, and Reporting Technology and is a part of the ATA standard. SMART attributes are used to measure drive “health” and enabled to warn the user (administrator, software program, etc.) of impending drive failure. [Learn more about S.M.A.R.T.](#)

Can an SSD be used in an external enclosure via USB or e-SATA?

Yes. Kingston SSDs can be used in USB, e-SATA, Thunderbolt and Firewire external enclosures. Note if the user chooses to enable a password via the ATA Security command, the drive will not be accessible via external enclosure.

Are Kingston SSDs built using NAND Flash or DRAM Memory?

Kingston SSDs are built using NAND Flash Memory.

What Operating Systems (OS) are supported?

Kingston SSDs are OS independent and will run on any system supporting a standard SATA interface.

Do Kingston SSDs require any special drivers?

No additional drivers are required.

Can a Kingston SSD be used in any system?

Kingston SSDs can be user-installed in any system that supports the SATA II or III interface. (SATA 3Gb/sec. and 6Gb/s)

Can Kingston SSDs be used for RAID?

• Yes, the A, E, DC, KC, HyperX, S, V and UV Series SSDs can be used in RAID configurations; however, Kingston recommends using the E and DC Series SSD for RAIDs on servers. [Learn more about RAID.](#)

Can Kingston SSDs be connected to SAS-based systems?

It is very common that SAS (Serial Attached SCSI) based systems and controllers also support SATA devices. Kingston recommends that users check with the system or controller documentation to make sure that both SATA and SAS drives are compatible. If they are, Kingston SSDs may be successfully used.

Do Kingston SSDs use Garbage Collection?

All Kingston SSDs use an intelligent and efficient garbage collection process that improves drive life with little impact on Flash endurance and is invisible to the user.

[Learn more about SSD garbage collection.](#)

Do Kingston SSDs employ wear-levelling?

Kingston SSDs integrate advanced wear-levelling techniques that incorporate a block picking algorithm capable of extending flash endurance and optimizing drive life. This unique wear-levelling ensures that the individual Flash memory blocks are consumed at a very balanced rate, not to exceed a 2% difference between the most often written blocks and least written.