True Speed
Sustained High Performance

What is True Speed?

More and more people on the internet who have bought SSDs find that they are fast and efficient at first, but that the performance drops after 2-3 months of use. It turns out that SSDs enter a dirty drive state and the performance is affected by garbage collection. Most SSDs are tested with a minimal amount of software. However, the structure of an SSD is multi-channeled and the best performance is achieved only when there are serial empty blocks. After being used for some time the SSD blocks become filled with fragmented data. This is the dirty drive state and it significantly limits the performance of the multi-channeled structure.

In the following simulation the speed of a brand new SSD is compared with that of one that has been used for a long time.

Specifications

Test Platform	
CPU	Intel i7 2600k 3.4Ghz (Turbo Disabled)
Motherboard	GA-P67A-UD5-B3
Bios revision	F3
Chipset	Intel P67
Memory Type	DDR3 1666MHz 4GB x 2
Graphics Card	nVIDIA GeForce GTX 560 Ti
Chipset Drivers	Intel 10.1.0.1008
Video Drivers	NVIDIA GeForce GTX 560 Ti 8.17.12.6644 64-bit
Power supply	SUPER FLOWER SF-500P14XE
OS	Windows 7 Ultimate x64 SP1

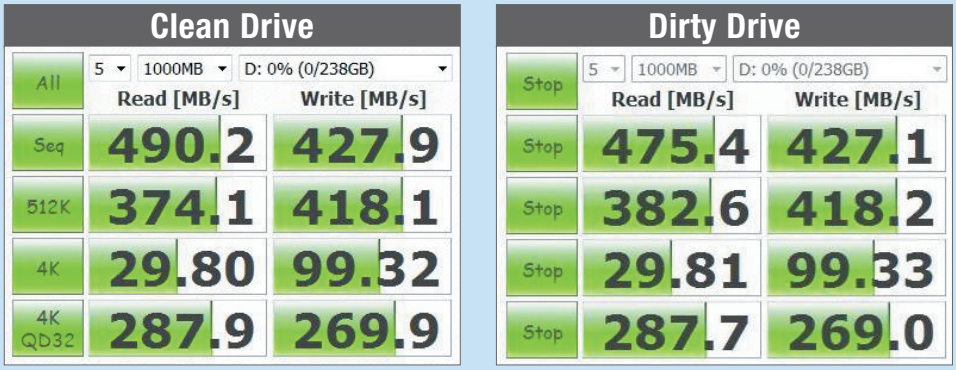
SSD specifications

Item	PX-256M2P
Form Factor	2.5" Standard
Interface	SATA 6.0Gb/s compatible with SATA 3.0Gb/s and SATA 1.5G/s
Capacity	256GB
Seq. Read Speed (@SATA 6Gb/s)	500 MB/s
Seq. Write Speed (@SATA 6Gb/s)	440 MB/s
Ran. Read Speed (4KB with QD= 32)	70,000 IOPS
Ran. Write Speed (4KB with QD= 32)	65,000 IOPS
DRAM Cache	512MB DDR3
Controller	Marvel 88SS9174
Power ECC	48bit per 2KB
Wear Leveling	Global Wear leveling
S.M.A.R.T.	Support
Password Protection	Support
NCQ Command	Support
TRIM Command	Support
Flash Memory	MLC type

Long-term usage simulation

After making a full disk using IOMeter, a 100% 4KB random write test to the Plextor SSD is carried out for 1.5 hour to stimulate long-term usage of the SSD with a large number of 4KB random data writes.

The Plextor SSD retains high efficiency



Summary

The Plextor SSD with Instant Restore technology optimizes the way data is written to blocks using a unique algorithm. Efficient and flexible DDR DRAM cache management allows users to spend less time emptying the blocks. The unique sweeper technology increases data write speed by automatically wiping junk data from the blocks to make them available. This ensures a read and write performance similar to the clean state of a brand new disk despite its being in the dirty state, to overcome the problem of performance degradation perfectly. This makes the SSD much more useful for digital learning applications, office software, audio, video, drawing and 3D visualization applications that require frequent SSD reads and writes!

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The controller IC used in some SSDs on the market, tested using Crystal Disk Mark, may provide over 500MB/s of write speed (by way of data compression) provided that 0 or 1 files with a high compression ratio, such as text files, are selected for the test. However, should Random files such as JPEG or AVI files be selected to simulate usage in the real world, the write speed will drop significantly to show actual SSD performance. The reason for this is simply that the data in all computers is in a non-0/1 state.

The following report is from a speed comparison test between 0- or 1- selected and Random-selected data transfer.

Non-0/1 is used to test the performance of SSD when accessing compressed data (such as pictures, videos and other multimedia documents) in the real world rather than non-0/1 data.

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Stimulated application test in the real world

Other brand

The write speed of other brands of SSD drops by 47% when Random data is selected for the test. This means that it will become significantly slower when a large picture file is saved.

Select 0 for testing

5 | 1000MB | D: 0% (0/112GB)

	Read [MB/s]	Write [MB/s]
Seq	533.2	484.0
512K	478.9	476.3
4K	40.42	132.4
4K QD32	203.6	339.5

Select 1 for testing

5 | 1000MB | D: 0% (0/112GB)

	Read [MB/s]	Write [MB/s]
Seq	532.9	483.7
512K	478.8	476.3
4K	40.57	133.4
4K QD32	208.5	339.7

Select Random for testing

5 | 1000MB | D: 0% (0/112GB)

	Read [MB/s]	Write [MB/s]
Seq	530.7	252.1
512K	488.0	253.6
4K	37.26	123.9
4K QD32	191.9	216.1

Plextor

The write speed of the Plextor M2P remains the same when Random is selected for testing. In this case, there is no doubt that the performance meets the requirements of users who frequently access a large amount of audio and video data.

Select 0 for testing

5 | 1000MB | D: 0% (0/238GB)

	Read [MB/s]	Write [MB/s]
Seq	491.0	431.3
512K	375.7	421.7
4K	30.10	101.4
4K QD32	289.0	271.9

Select 1 for testing

5 | 1000MB | D: 0% (0/238GB)

	Read [MB/s]	Write [MB/s]
Seq	499.8	431.0
512K	376.2	421.2
4K	30.06	101.2
4K QD32	293.1	271.1

Select Random for testing

5 | 1000MB | D: 0% (0/238GB)

	Read [MB/s]	Write [MB/s]
Seq	498.1	431.3
512K	376.2	421.8
4K	30.05	100.9
4K QD32	293.3	271.6

Summary

With the servo-grade 88SS9174-BKK2 control chip of Marvell® - leader in the storage area, Plextor M2P provides high-speed performance without data compression. When Random is selected for the Crystal Disk Mark test, the read and write speed of Plextor M2P is quite similar. As for the SSD from the competition that transfers data after data compression, the read and write speed is similar to that of Plextor M2P provided that 0 or 1 is selected for the test. However, when Random is selected to stimulate usage in the real world, the performance of the competition's SSD will drop immediately.