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**TOSHIBA ANNOUNCES SATA ENTERPRISE READ INTENSIVE SSD FOR SERVER, STORAGE AND DATA CENTER APPLICATIONS**

*The HK3R SSD series is ideal for server attached storage applications requiring full data-path and power-loss protection*

**IRVINE, Calif. — December 9, 2013** — The Storage Products Business Unit of Toshiba America Electronic Components, Inc., a committed technology leader, announces the HK3R enterprise solid state drive (eSSD). The HK3R series has a 2.5-inch form factor and 6Gb/s<sup>1</sup> SATA interface integrated with Toshiba 19nm NAND flash for high quality and reliability. The HK3R eSSD is optimized for read-intensive applications such as read-caching, error logging, boot, and low-duty storage applications requiring power-loss-protection and end-to-end data protection features.

The HK3R eSSD incorporates Toshiba proprietary QSBC<sup>®</sup> (Quadruple Swing-By Code) error-correction technology<sup>2</sup>, a highly efficient error correction code (ECC), to ensure that customer data is safe and accessible. The HK3R eSSD is available in capacities up to 480 GB<sup>3</sup> and supports one full drive write per day<sup>4</sup> with a one hundred percent random data, aligned 4KiB workload. The HK3R eSSD delivers enterprise-class reliability and consistent, sustained high performance over the life of the product. Additionally, the HK3R eSSD carries a 5-year limited warranty<sup>5</sup>.

“Toshiba recognizes the importance of eSSD reliability and designs our eSSDs with full power loss protection and QSBC error protection technology to put our customers’ minds at ease,” said Don Jeanette, senior director of marketing at Toshiba

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<sup>1</sup> Read and write speed may vary depending on the host device, read and write conditions, and file size.

<sup>2</sup> QSPC is a registered trademark of Toshiba Corporation in the United States.

<sup>3</sup> Definition of capacity: Toshiba defines a megabyte (MB) as 1,000,000 bytes, a gigabyte (GB) as 1,000,000,000 bytes and a terabyte (TB) as 1,000,000,000,000 bytes. A computer operating system, however, reports storage capacity using powers of 2 for the definition of 1GB = 2<sup>30</sup> = 1,073,741,824 bytes and therefore shows less storage capacity. Available storage capacity (including examples of various media files) will vary based on file size, formatting, settings, software and operating system, such as Microsoft Operating System and/or pre-installed software applications, or media content. Actual formatted capacity may vary.

<sup>4</sup> One full drive write per day means the drive can be written and re-written to full capacity 1 time a day for five years, the stated product warranty period. Actual results may vary due to system configuration, usage, and other factors.

<sup>5</sup> Limited warranty guide can be found online at <http://storage.toshiba.com/storage-services-support/technical-support/warranty>.

Storage Products Business Unit. “Toshiba understands that keeping enterprise data safe and accessible is of the utmost importance.”

The HK3R 120GB, 240 GB and 480GB customer samples will begin shipping in December 2013. For more information on Toshiba’s line of industry-leading SSDs, HDDs and SSHDs, visit [www.toshibastorage.com](http://www.toshibastorage.com). To connect with Toshiba Storage, visit the corporate blog at <http://storage.toshiba.com/corporateblog/> and follow [@ToshibaStorage](https://twitter.com/ToshibaStorage) on Twitter.

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## Specifications

|   |               | <b>HK3R series</b>                                |               |               |
|---|---------------|---|---------------|---------------|
|   |               | THNSNJ480PCS3                                     | THNSNJ240PCS3 | THNSNJ120PCS3 |
| <b>User Capacity</b>  |               | 480GB   | 240GB         | 120GB         |
| <b>NAND</b>   |               | 19nm MLC  |               |               |
| <b>Interface</b>  |               | SATA-3.0 (6.0Gb/s, 3.0Gb/s, 1.5Gb/s)              |               |               |
| <b>2.5-inch Form Factor</b>   | <b>Height</b> | 7.0 mm<br>+0, -0.5 mm                             |               |               |
| <b>Performance</b><br>(@ QD = 32, Aligned, Sustained, Entropy=100%) |               |   |               |               |
| Sequential Read 64KiB   |               | 500 MiB/s <sup>6</sup>                            |               |               |
| Sequential Write 64KiB  |               | 400 MiB/s   | 280 MiB/s     |               |
| Random Read 4KiB  |               | 75,000 IOPS                                       |               |               |
| Random Write 4KiB   |               | 12,000 IOPS                                       | 10,000 IOPS   |               |
| Power consumption Ready (Idle A)                                    |               | 1.0 W Typ.  |               |               |
| Power consumption efficiency  |               | 75,000 IOPS/W                                     |               |               |
| MTTF  |               | 2,000,000 hours                                   |               |               |
| Product Life  |               | 5 years   |               |               |
| <b>Temperature</b>  |               |   |               |               |
| Operating   |               | 0 to 55°C   |               |               |
| Non-Operating   |               | -40 to 70°C                                       |               |               |
| <b>Vibration/Shock</b>  |               |   |               |               |
| Vibration (Operating)   |               | 21.27 m/s <sup>2</sup> {2.17Grms} (5 to 800Hz)    |               |               |
| Vibration (Non-operating)   |               | 159.74 m/s <sup>2</sup> {16.3Grms} (20 to 2000Hz) |               |               |

|                       |   |
|-----------------------|---|
| Shock (Operating)     | 9,800 m/s <sup>2</sup> { 1,000G } / 0.5 ms duration |
| Shock (Non-operating) | 9,800 m/s <sup>2</sup> { 1,000G } / 0.5 ms duration |
| <b>Others</b>         |   |
| Power Loss Protection | Yes   |

#### **About Toshiba Storage Products**

Toshiba Corporation and its affiliates offer one-of-a-kind global storage solutions, offering hard disk drives (HDDs), solid state drives (SSDs) and NAND flash memories — technologies that drive a wide range of consumer electronics, computer and automotive applications, as well as enterprise solutions for the global marketplace. Toshiba is a leader in the development, design and manufacture of mobile, consumer and enterprise hard disk drives and solid state drives. In North America, the Storage Products Business Unit of Toshiba America Electronic Components, Inc., markets high-quality storage peripherals to original equipment manufacturers, original design manufacturers, value-added resellers, value-added dealers, systems integrators and distributors worldwide. Inherent in the Toshiba storage family are the high-quality engineering and manufacturing capabilities that have established Toshiba products as innovation leaders worldwide. For more information, visit [www.toshibastorage.com](http://www.toshibastorage.com).

#### **About Toshiba Corp. and Toshiba America Electronic Components, Inc. (TAEC)**

Through proven commitment, lasting relationships and advanced, reliable electronic components, Toshiba enables its customers to create market-leading designs. Toshiba is the heartbeat within product breakthroughs from OEMs, ODMs, CMs, VARs, distributors and fabless chip companies worldwide. A committed electronic components leader, Toshiba designs and manufactures high-quality flash memory-based storage solutions, solid state drives (SSDs), hard disk drives (HDDs), discrete devices, advanced materials, medical tubes, custom SoCs/ASICs, imaging products, microcontrollers and wireless components that make possible today's leading smartphones, tablets, MP3 players, cameras, medical devices, automotive electronics, enterprise solutions and more.

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