



2016 Product Line Card

SanDisk Commercial Flash Storage Solutions

SanDisk[®]
a Western Digital brand

Spring, 2016

SSDs

2016 Product Line Card



X400 SSD

Built with SanDisk's sixth-generation TLC flash, the X400 SSD offers quick responsiveness, high reliability and low power for a seamless experience for thin and ultramobile notebooks. Backed with a 5-year warranty, it's the ideal storage solution for heavy workloads such as photo and video editing, multitasking or office productivity.

With a 1.5mm single-sided form factor (M.2 2280 module), the X400 SSD is the first single-sided 1TB SSD in the industry, giving it the performance and capacities ideal for ultrathin designs. The X400 SSD is also available in 2.5" 7mm-height to be a true drop in replacement for mechanical HDDs.



Z400s SSD

The Z400s SSD can outperform HDDs by a factor of five at 1/20th the power consumption¹.

High endurance and reliability are the hallmark of an embedded solution. The Z400s can provide up to 1.7 million hours¹ of continual use and exceptional stability during peak activity. Exceptional reliability, low maintenance and high performance can all add up to a lower total cost of ownership (TCO).



Z410 SSD

The SanDisk Z410 is a value/performance SSD designed to replace HDDs in essential-class computing platforms. It can outperform HDDs by a factor of 24, while providing 5 times the reliability at 1/20th the power consumption¹, and ample capacity while serving as an affordable storage solution.

Building upon the successful Z400s platform, the Z410 is further optimized specifically for PC users. With faster write speeds, the Z410 SSD delivers a quick and responsiveness user experience for everyday PC applications, all in an affordable solution.



CloudSpeed™ Gen. II SSDs

The CloudSpeed Ultra™ and CloudSpeed Eco™ Gen. II SATA SSDs are geared for a variety of read-intensive and mixed use workloads.

- **CloudSpeed Ultra Gen. II SATA SSD:** Optimized for latency-sensitive application and mixed-use workloads for predictable random I/O write performance, this flash storage solution works within existing infrastructure—SATA interface—and can replace hard disk drives for lower total cost of ownership and better data center efficiency through server consolidation.
- **CloudSpeed Eco Gen. II SATA SSD:** Optimized for read-intensive cloud workloads—video/media streaming and content repositories—where sustained data throughput is critical to satisfy end users of cloud services. Designed to replace high-capacity HDDs, CloudSpeed Eco Gen. II SSD enables highly-scalable cloud architectures for consumer and enterprise cloud offerings.



Lightning® Gen. II Product Family of SAS SSDs

Lightning Gen. II SAS SSDs feature 12Gb/s interface—double the bandwidth of traditional SATA and SAS drives—and an innovative parallel processing architecture to provide both the peak and sustained performance for transaction processing, media editing and delivery, boot storms, e-commerce and growing numbers of simultaneous users.

- **Lightning Eco™ Gen. II SSD:** Offers solid I/O cost to performance benefits with low latency data access for high quality of service (QoS).
- **Lightning Ascend™ Gen. II SSD:** Offers superior reliability with high speed data transfer rates where quick access to data is essential.
- **Lightning Ultra™ Gen. II SSD:** Offers industry-leading predictable performance with high availability for the analysis of large data sets.

Optimus Max™ 4TB SAS SSD

The Optimus Max 4TB SAS SSD is the first SSD of its kind to deliver SAS performance and features at the cost of SATA SSD-like prices for enterprise, cloud and virtualized data centers. This 4TB² SSD enables organization to transition to a leaner infrastructure model, for maximum total cost of ownership (TCO) savings and surpasses the current high capacity 2.5" SAS SSDs and 2.5" SAS HDDs on the market today.



Optimus™ Product Family of SAS SSDs

Through a combination of unique and innovative IP, and the use of enterprise MultiLevel Cell (eMLC) flash, SanDisk's newest generation of 19nm eMLC SSDs feature a native SAS 6Gb/s interface, outstanding performance metrics, and a comprehensive set of high-end features making them ideal to integrate with existing infrastructure for a wide variety of enterprise environments such as servers, external storage arrays, and storage area networks (SAN) where performance and high-availability are required.

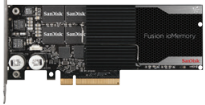
1. Based on internal testing using Telcordia stress part testing
2. 1TB = 1,000,000,000,000 bytes. Actual user capacity less.

SanDisk Product Line						
Product	Ideal For	Capacity	Part #	Random R/W	Sequential R/W	Form
X400 SSD	Corporate PCs, Notebooks, and Embedded Systems	128GB	SD8SB8U-128G *	Up to 95K/75K IOPS	Up to 545/520 MB/s	2.5" 7mm M.2 (2280)
		256GB	SD8SB8U-256G *			
		512GB	SD8SB8U-512G *			
		1TB	SD8SB8U-1T00 *			
Z410 SSD	Laptops, Desktops, Battery-based platforms and fan-less designs	120GB	SD8SBBU-120G-1122	Up to 35K/69K IOPS	Up to 540/445 MB/s	2.5" 7mm
		240GB	SD8SBBU-240G-1122			
		480GB	SD8SBBU-480G-1122			
Z400s SSD	Value PC, and Embedded Systems	32GB	SD8SBAT-032G *	Up to 33K/62K IOPS	Up to 520/330 MB/s	2.5" 7mm M.2 (2280) mSATA
		64GB	SD8SBAT-064G *			
		128GB	SD8SBAT-128G *			
		256GB	SD8SBAT-256G *			
CloudSpeed Eco Gen II SSD SATA	Read-Intensive Workloads, such as: • Social Media • Web Servers • Content Repositories • Media Streaming	480GB	SDLFIDAR-480G-1HA2	Up to 76K/14K IOPS	Up to 530/460 MB/s	2.5"
		960GB	SDLFIDAR-960G-1HA2			
		1.92TB	SDLF1CRR-019T-1HA2			
CloudSpeed Ultra Gen II SSD SATA	Mixed Use Workloads, such as: • Demanding QoS, Latency-Sensitive Applications and Databases • IaaS, PaaS, and SaaS infrastructure • NoSQL Performance Acceleration • OpenStack® • Software-Defined Storage • E-Commerce, micropayments	400GB	SDLF1DAM-400G-1HA2	Up to 76K/32K IOPS	Up to 530/460 MB/s	2.5"
		800GB	SDLF1DAM-800G-1HA2			
		1.6TB	SDLF1CRM-016T-1HA2			
Lightning Eco Gen II SSD 12Gb/s SAS	Read-Intensive Workloads, such as: • Data Warehousing • Media Streaming • Video on Demand • Web-Based Applications	800GB	SDLTODKR-800G-5CA1	Up to 195K/80K IOPS	Up to 980/600 MB/s	2.5"
		1.6TB	SDLTOCKR-016T-5CA1			
Lightning Ascend Gen II SSD 12Gb/s SAS	Mixed Use Workloads, such as: • On-Line Transaction Processing (OLTP) Databases • Financial Transactions • E-Commerce • Email/Messaging • Virtual Desktop Infrastructure (VDI)	200GB	SDLTODKM-200G-5CA1	Up to 195K/100K IOPS	Up to 980/600 MB/s	2.5"
		400GB	SDLTODKM-400G-5CA1			
		800GB	SDLTODKM-800G-5CA1			
		1.6TB	SDLTOCKM-016T-5CA1			
Lightning Ultra Gen II SSD 12Gb/s SAS	Write-Intensive Workloads, such as: • High Performance Computing (HPC) • Oil and Gas Exploration • Life Sciences • Engineering • Media Editing • Analytics • Indexing • Database Logging	200GB	SDLTMDKW-200G-5CA1	Up to 199/115K IOPS	Up to 980/740 MB/s	2.5"
		400GB	SDLTMDKW-400G-5CA1			
		800GB	SDLTMCKW-800G-5CA1			
Optimus MAX SSD 6Gb/s SAS	Read-Intensive Application Workloads. Enterprise, Cloud and Virtualized Data Center	4TB	SDLLOCDR-038T-5CA1	Up to 85K/11K IOPS	Up to 500/500 MB/s	2.5"
Optimus Eco SSD 6Gb/s SAS	Read-Intensive Workloads, such as: • Data Warehousing • Media Streaming • Video on Demand • Web-Based Applications	400GB	SDLKODDR-400G-5CA1	Up to 90K/35K IOPS	Up to 530/530 MB/s	2.5"
		800GB	SDLKOCDR-800G-5CA1			
		1.6TB	SDLLOCDR-016T-5CA1			
		2TB	SDLLOCDR-020T-5CA1			
Optimus Ascend SSD 6Gb/s SAS	Mixed Use Workloads, such as: • On-Line Transaction Processing (OLTP) Databases • Financial Transactions • E-Commerce • Email/Messaging • Virtual Desktop Infrastructure (VDI)	200GB	SDLKOEDM-200G-5CA1	Up to 95K/40K IOPS	200GB: Up to 550/380 MB/s	2.5"
		400GB	SDLKODDM-400G-5CA1		400GB - 1.6TB: Up to 550/540 MB/s	
		800GB	SDLKOCDM-800G-5CA1			
		1.6TB	SDLLOCDM-016T-5CA1			
Optimus Ultra SSD 6Gb/s SAS	Write-Intensive Workloads, such as: • High Performance Computing (HPC) • Oil and Gas Exploration • Life Sciences • Engineering • Media Editing • Analytics • Indexing • Database Logging	150GB	SDLKOEKW-150G-5CA1	Up to 95K/40K IOPS	150GB: Up to 550/380 MB/s	2.5"
		300GB	SDLKODGW-300G-5CA1		300GB - 1.2TB: Up to 550/540 MB/s	
		600GB	SDLKOCGW-600G-5CA1			
		1.2TB	SDLLOCGW-012T-5CA1			
Optimus Extreme SSD 6Gb/s SAS Highest Endurance	Write-Intensive Workloads, such as: • High Performance Computing (HPC) • Oil and Gas Exploration • Life Sciences • Engineering • Media Editing • Analytics • Indexing • Database Logging	100GB	SDLKOE9W-100G-5CA1	Up to 95K/40K IOPS	100GB: Up to 550/380 MB/s	2.5"
		200GB	SDLKOD9W-200G-5CA1		200GB - 800GB: Up to 550/540 MB/s	
		400GB	SDLKOC9W-400G-5CA1			
		800GB	SDLLOC9W-800G-5CA1			

* Part number pertains to 2.5" form factor

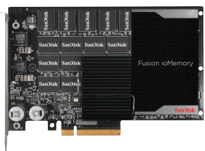
PCIe Cards

2016 Product Line Card



Fusion ioMemory™ PX600 Accelerator

Accelerate Your Core Operations. The Fusion ioMemory PX600 is a cost-effective solution for accelerating mixed-use workloads. The PX600 series provides 1TB to 5.2TB* of fast flash memory to accelerate the flow of data between servers and other assets. The end result? Data centers become optimized for utilization and performance, reducing your TCO while boosting productivity.



Fusion ioMemory™ SX350 PCIe Application Accelerator

The Fusion ioMemory SX350 PCIe Application Accelerator is a cost-effective solution for accelerating read-intensive workloads. Fusion ioMemory PCIe application accelerators with up to 6.4TB* of fast flash memory to accelerate the flow of data between servers and other assets. The end result? Data centers become optimized for utilization and performance, increasing your TCO while boosting productivity.

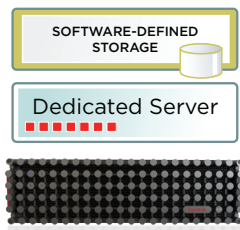
* 1TB = 1,000,000,000,000 bytes. Actual user capacity less.

SanDisk Product Line

Product	Ideal For	Capacity	Part #	Random R/W	Sequential R/W	Form
PX600 Enterprise PCIe Gen2 x8	Mixed Use Workloads, such as: • High Performance Computing (HPC) • Data Mining • Seismic Data Processing • Content Caching • 3D Animation	1TB	SDFACAMOP-1T00-SF1	Up to 196K/330K IOPS	Up to 2.7/1.5 GB/s	Low Profile HH/FH
		1.3TB	SDFACAMOP-1T30-SF1	Up to 235K/375K IOPS	Up to 2.7/1.7 GB/s	
		2.6TB	SDFACAMOP-2T60-SF1	Up to 350K/385K IOPS	Up to 2.7/2.2 GB/s	
		5.2TB	SDFACCMOP-5T20-SF1	Up to 285K/385K IOPS	Up to 2.7/2.1 GB/s	
SX350 Hyperscale PCIe Gen2 x8	Read-Intensive Workloads, such as: • High Performance Computing (HPC) • Data Mining • Seismic Data Processing • Content Caching • 3D Animation	1.3TB	SDFADAMOS-1T30-SF1	Up to 225K/345K IOPS	Up to 2.8/1.3 GB/s	Half Length HH/FH
		1.6TB	SDFADAMOS-1T60-SF1	Up to 270K/375K IOPS	Up to 2.8/1.7 GB/s	
		3.2TB	SDFADAMOS-3T20-SF1	Up to 345K/385K IOPS	Up to 2.8/2.2 GB/s	
		6.4TB	SDFACCMOS-6T40-SF1	Up to 285K/385K IOPS	Up to 2.8/2.2 GB/s	

Flash Systems

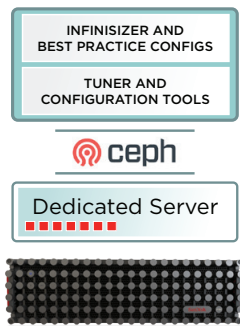
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InfiniFlash™ System IF150

All-Flash Storage System for Big Data

The InfiniFlash System IF150 is a massive scale-out, all-flash storage system that provides boundless scale, efficiency, and resiliency for hyperscale and cloud workloads, dramatically reducing cost and complexity.



InfiniFlash™ System IF550

All-Flash Storage System for OpenStack®

The InfiniFlash System IF550 provides petabyte-scale capacity, high density and performance for OpenStack/Ceph environments, delivering breakthrough economics for customers with big data storage requirements.

InfiniFlash System Product Specifications	
Capacity	
Maximum raw capacity	512TB ² in 3U
Performance	
IOPS	2M IOPS (raw hardware)
Throughput	12GBps (raw hardware)
Power and connectivity	
Power per node	Active: 750W, Idle: 350W
Connectivity: SAS 3.0 12Gb/s	8 SFF-8088 connectors;
Reliability, Availability and Serviceability	
MTBF	1.5 million hours
Hot-swappable hardware	Expanders, fans, power supplies, flash cards
Fans	N+2 (Sustain any two fan failures)
Power Supplies	N+1 (Sustain any one power supply failure)
Expanders	N+1 (Sustain any one expander failure)
Compatibility	
Node OS (IF550)	Ubuntu 14.04
Application Servers	All Linux distributions

InfiniFlash Software Specifications	
Performance*	
IOPS with IF550 Ceph	>1M ³
Throughput with IF550 Ceph	12GB/s
Latency with IF550 Ceph	<2msec
Scalability	
Per cluster or namespace	10s - 100s of nodes
Maximum unique objects (per cluster or namespace)	1B per device group; no limits on device groups
Maximum replicas	10 per unique object
Total cluster maximum	15PB
Services and Protocols	
Cloud protocol access	RESTful API, Swift, S3 API
Block access	iSCSI
Snapshots	256
Data protection	Snapshots, configurable replicas, erasure coding
Disaster recovery	Geographic asynchronous replication of objects
Management	CLI, RESTful HTTP
Maximum storage zones (for protection)	64,000 per cluster or namespace

* Based on internal testing. Test report available. Results and performance may vary according to system adoption, configuration and broader system architecture



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For more than 25 years, SanDisk's ideas have helped transform the industry, delivering next generation storage solutions for consumers and businesses around the globe.

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