The world's fastest, most energy-efficient 60TB data center SSD[1]

As the PCIe® Gen5 successor to the award-winning Micron® 6500 ION SSD,[2] the Micron 6550 ION SSD continues to push the limits of exascale storage. With best-in-class PCIe Gen5 performance, energy efficiency, endurance, security, and density, the Micron 6550 ION was built to be the world's leading 60TB SSD.

For data centers needing to get more out of the IT budget without having to compromise, the Micron's 6550 ION is the answer.

Accelerate exascale AI workloads.
Best-in-class 60TB read *and* write bandwidth delivers faster data collection, loading, pre-processing, checkpointing, ingesting, and more for better networked artificial intelligence (AI) data lake performance.

Outperform competing 60TB SSDs using up to 20% less power.[3]
The Micron 6550 ION needs just 20W to achieve its rated performance versus competing 60TB QLC SSDs, which need to run at 25W to achieve rated performance.

Store up to 67% more per rack than competing 60TB SSDs.[4]
As the world's first E3.S 60TB SSD, the Micron 6550 ION enables 1PB per U for 67% more density than previous U.2 60TB SSDs.

Micron 6550 ION SSD: U.2 (15mm), E3.S-1T (9.5mm), and E1.L (9.5mm)

Key Benefits

Best-in-class 60TB performance
- Up to 179% more read bandwidth
- Up to 150% more write bandwidth
- Up to 80% more random read IOPS

Best-in-class 60TB power efficiency[5]
- Up to 179% better read bandwidth per watt
- Up to 213% better write bandwidth per watt
- Up to 99% better read IOPS per watt

Best-in-class 60TB SSD features and density[6]
- **Leading density:** Store up to 1PB per U with the world's first E3.S 60TB SSD
- **Leading endurance:** 1 random drive write per day (RDWPD) for 16KB random writes
- **Leading NAND:** Built on Micron G8 TLC NAND, which is up to three generations ahead of competing 60TB SSDs
- **Leading OCP support:** World's first 60TB SSD with OCP 2.5 support, which enables up to 20% lower idle power consumption (4W vs. 5W) via L1-ASPM feature
- **Leading security and features**: SPDM 1.2 (attestation), SHA-512 (secure signature generation), FIPS 140-3 L2 certifiability, SGL, SRIS, and more[7]
- **Leading supply chain security**: Dual-sourced SSD manufacturing sites with TAA-compliant SKUs
- **Qualify with confidence:** Vertically integrated architecture: Micron NAND, DRAM, controller, and firmware

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1. Among 60TB (61.44TB advertised capacity. Unformatted capacity, 1GB = 1 billion bytes, formatted capacity is less) NVMe data center SSDs from Solidigm, Samsung, and Western Digital. Performance and other comparison statements based on public information available as of the date of this document's publication and Micron engineering testing. Power efficiency refers to units of work done divided by power consumed in doing that work. Examples of units of work included, but are not limited to, IOPS, MB/s, operations per second, sample rates, and similar data center storage-related activities.
2. The Micron 6500 ION SSD won gold in the 2024 Edison Awards for Commercial Technology and also won the 2023 International Innovation Award for its role improving AI scaling and sustainability in data centers all around the world. See https://www.micron.com/6500ion for additional details.
3. The Micron 6550 SSD delivers superior performance (read and write bandwidth, read IOPS) at a 20W maximum power limit (denoted as "20W" compared to competing 60TB Samsung BM1743 and Solidigm D5-P5336 specifications at 25W maximum power limit (denoted as 25W) and more performance at 20W maximum power limit than the competing 60TB Western Digital Ultrastar DC SN655. 20 watt savings based on public data sheet specifications and calculated as ((25W – 20W) / 25W), expressed as a percentage. Actual power consumption may vary by use case. Performance details appear later in this document.
4. Improvement calculated by comparing 60TB Micron 6550 ION SSD E3.S-1T in a 1U server with 20 E3.S bays (60TB x 20 = 1.2PB per U), versus competitor's 60TB U.2 form factor in a 2U 24-bay server (60TB x 24 = 1.5PB in 2U server = 0.75PB per U), expressed as a percentage.
5. Based on public power and performance information available at the time of this document's publication. Per-watt statements are calculated as (stated performance / stated power consumption) - 1. Comparisons expressed as a percentage.
6. NAND generation refers to equivalent NAND industry generation number. The Micron 6550 ION SSD uses Micron G8 (232-layer) NAND; Solidigm D5-P5336 uses 192-layer QLC NAND (one generation older), Samsung BM1743 uses V7 QLC NAND (176-layer, one generation older), and Western Digital Ultrastar DC SN655 uses BiCS5 (112 layer NAND, 3 generations older). Comparisons based on public information available at the time of this document's publication. The Micron 6550 ION SSD complies with most, but not all, requirements of the Open Compute Project Datacenter NVMe SSD Specification 2.5 (variances possible based on different configurations or implementations).
7. No hardware, software, or system can provide absolute security under all conditions. Micron assumes no liability for lost, stolen or corrupted data arising from the use of any Micron products.

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Best-in-class performance

The Micron 6550 ION offers the best performance and fill / rebuild times for SSDs in its class. For applications that do not need all the performance that Micron 6550 ION delivers at 25W (or even 20W), the drive's NVMe configurable power states feature can be used to lower power consumption to as low as 10W for even better total cost of ownership (TCO).[8]

Performance[9]	AI-related use case	Micron 6550 ION SSD	Solidigm D5-P5336	Samsung BM1743	Western Digital SN655	The ION advantage
Sequential reads	Training and inference	12,000 MB/s	7,000 MB/s	7,500 MB/s	4,300 MB/s	Up to 179% better
Sequential writes	Data ingest, pre-processing, checkpointing	5,000 MB/s	3,000 MB/s	2,000 MB/s	3,150 MB/s	Up to 150% better
Random reads	Graph neural networks	1,600 KIOPS	1,005 KIOPS	1,600 KIOPS	890 KIOPS	Up to 80% better
Fill time (100% sustained 128KB seq. writes)	Data lake resiliency and rebuilds	3.4 hours	5.5 hours	8.6 hours	5.4 hours	Up to 150% better

Table 1: Micron 6550 ION SSD performance comparison

Best-in-class power efficiency

Sustainable data centers thrive with power-efficient, ultra-dense servers and storage. Better performance with lower power consumption can help reduce power and cooling requirements and carbon footprint through server footprint reduction (which can also decrease license costs).[10] This is achieved while meeting real-world workload goals for high capacity NVMe SSDs, such as networked AI data lakes, object stores, all-flash arrays, software-defined storage, public cloud storage, general-purpose storage, analytics, NoSQL databases, content delivery, and more.

Power efficiency on 60TB SKUs	Micron 6550 ION (20W)	Solidigm D5-P5336 (25W)	Samsung BM1743 (25W)	Western Digital SN655 (20W)	The ION advantage
Read bandwidth (in MB/s per watt)	600	280	300	215	Up to 179% better
Write bandwidth (in MB/s per watt)	250	120	80	158	Up to 213% better
Random read (in KIOPS per watt)	80	40	64	45	Up to 99% better

Table 2: Micron 6550 ION SSD energy efficiency details

Best-in-class SSD features and E3.S density

The Micron 6550 ION SSD offers unparalleled storage density and features in an E3.S SSD. It helps reduce data center rack footprint by 67% with its industry-leading technology and innovation.

Micron 6550 ION SSD feature	The ION advantage
Leading density	Store up to 1PB per U with the world's first E3.S 60TB SSD
Leading endurance	1 RDWPD for 16KB random writes vs. 0.26 on Samsung BM1743, 0.58 on Solidigm D5-P5336, and 1.0 on WD Ultrastar SN655
Leading NAND	Built on Micron G8 TLC NAND, which is 1-3 generations ahead of competing 60TB SSDs
Leading OCP support[11]	World's first 60TB SSD with OCP 2.5 support, enabling up to 20% lower idle power (4 watts vs. 5 watts) via L1-ASPM feature
Leading security features	SPDM 1.2 (attestation), SHA-512 (secure signature generation), FIPS 140-3 L2 certifiability, SGLs, SRIS, and more
Leading supply chain security	Dual-sourced SSD manufacturing sites with TAA-compliant SKUs available
Qualify with confidence	Vertically integrated architecture: Micron NAND, DRAM, controller, firmware, validation, and manufacturing

Table 3: Micron 6550 ION SSD features and E3.S density comparisons

8. TCO is based on multiple factors, including power consumption. Statement is not based on a specific TCO model, calculation, or standard.
9. Sequential performance based on a 128KB transfer size and a queue depth of 128. Random read performance based on 4KB transfer size and a queue depth of 512. Comparison based on public information available at the time of this document's publication. Example calculation for sequential read value shown: (Micron 6550 ION NVMe SSD 12,000 MB/s) / (Western Digital SN655 4,300 MB/s) - 1 = 1.79, or 179%. Other measurements calculated similarly. Fill time calculations based on SSD 128KB sequential write rate and capacity. Fill time calculated using PS0 write rate (helps ensure no SSD was power-limited during the fill tests). Example calculation for fill time: (Micron 6550 ION SSD 3.4 hours) / (Samsung BM1743 8.6 hours) - 1 = 8.6 / 3.4 - 1 = 1.50, or 150% better.
10. License consolidation refers to software that is licensed per server. The Micron 6550 ION enables the storage of a similar amount of data in fewer servers compared to SSDs with lower capacity.
11. See https://www.opencompute.org/ for additional details on associated standards. The Micron 6550 ION SSD complies with nearly all requirements in the Open Compute Project Datacenter NVMe SSD Specification 2.5, with variance possible based on different configurations or implementations.

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Micron 6550 ION SSD key specifications

		U.2 (15mm)	E1.L (9.5mm)	E3.S-1T (7.5mm)
Capacities	Available in all form factors		30.72TB and 61.44TB (same specs across all SKUs)	
Performance [12] 128KB sequential transfers, 4KB random transfers	**Sequential read** (MB/s, QD128)		12,000	
	Sequential write (MB/s, QD128)		5,000	
	Random read (IOPS, QD512)		1,600,000	
	Random write (IOPS, QD128)		70,000	
	Read latency (µs, QD1, typical)[13]		70	
Power Consumption & Use Active average, RMS[13]	**Active** (to achieve performance levels noted)		≤20W	
	Max (to exceed performance levels noted)		25W	
	Idle		≤5W	
	Operating temperature range		0°C to 70°C	
Endurance by Workload [14]	**100% 128KB sequential writes**		1.00 SDWPD	
	100% 16KB random writes		1.00 RDWPD	
	90% 16K / 10% 4K random writes		0.90 RDWPD	
	70% 16K / 30% 4K random writes		0.75 RDWPD	
	50% 16K / 50% 4K random writes		0.60 RDWPD	
	100% 8K random writes		0.50 RDWPD	
	100% 4K random writes		0.25 RDWPD	
	JESD219A workload mix[15]		0.30 DWPD	
Basic Attributes	**Interface**		PCIe Gen5 1x4 NVMe (v2.0b)	
	NAND		Micron G8 TLC NAND	
Reliability	**MTTF**[16]		2.5 million device hours	
	UBER		<1 sector per 10^{17} bits read	
	Warranty		5 years	

Table 4: Micron 6550 ION SSD key specifications

Note: All values provided are for reference only and are not warrantied values. For warranty information, visit https://www.micron.com/sales-support/sales/returns-and-warranties/enterprise-ssd-warranty or contact your Micron sales representative. Values represent the theoretical maximum endurance for the given transfer size and type. Actual lifetime will vary by workload.

Micron 6550 ION SSD part numbers

Micron 6550 ION SSD part number information is provided below for configuration-dependent values (shown in bold). Other part number values in the example part number are fixed. See the parts catalog at micron.com/6550ION for more information.

MT　FD　L　**AL**　**30T7**　T　HL　-　**1**　BK　**4**　J　**AB**　YY

Form factor
AL　=　U.2 (15mm)
BN　=　E1.L (9.5mm)
BQ　=　E3.S-1T (7.5mm)

Drive Capacity
30T7　=　30.72TB
61T4　=　61.44TB

Sector Size
1　=　512 bytes
4　=　4096 bytes

Extended Options
AB　=　Standard
FC　=　FIPS (TAA compliant + FIPS 140-3 L2 certifiable)

Extended Firmware Features
J　=　OCP 2.5 (Non-SED)
D　=　OCP 2.5 + SED (TCG Opal)

12. Actual power consumption will vary by workload. All listed values are at 20 watt maximum power consumption.
13. Idle power consumption enabled by OCP 2.5, which defines host-enabled L1-ASPM idle power behavior, which enables ≥20% power savings compared to leaving the Micron 6550 ION in L0 (standard idle). Only the Micron 6550 ION has OCP 2.5 support vs. competitive 60TB SSDs per footnotes 1 and 2. For more information on L1-ASPM, refer to the OCP 2.5 public specification, which is available at https://www.opencompute.org/documents/datacenter-nvme-ssd-specification-v2-5-pdf.
14. Actual lifetime will vary by workload. Refer to percentage used in the SMART/health information (Log Identifier 02h) to monitor device lifetime used.
15. For additional information on the JEDEC JESD219A workload, refer to https://www.jedec.org/standards-documents/docs/jesd219a.
16. Product achieves MTTF based on population statistics not relevant to individual units. 2.5M hour MTTF at 50°C in SMART per OCP REL-1. MTTF at 55°C is 2M hours per OCP REL-2.

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