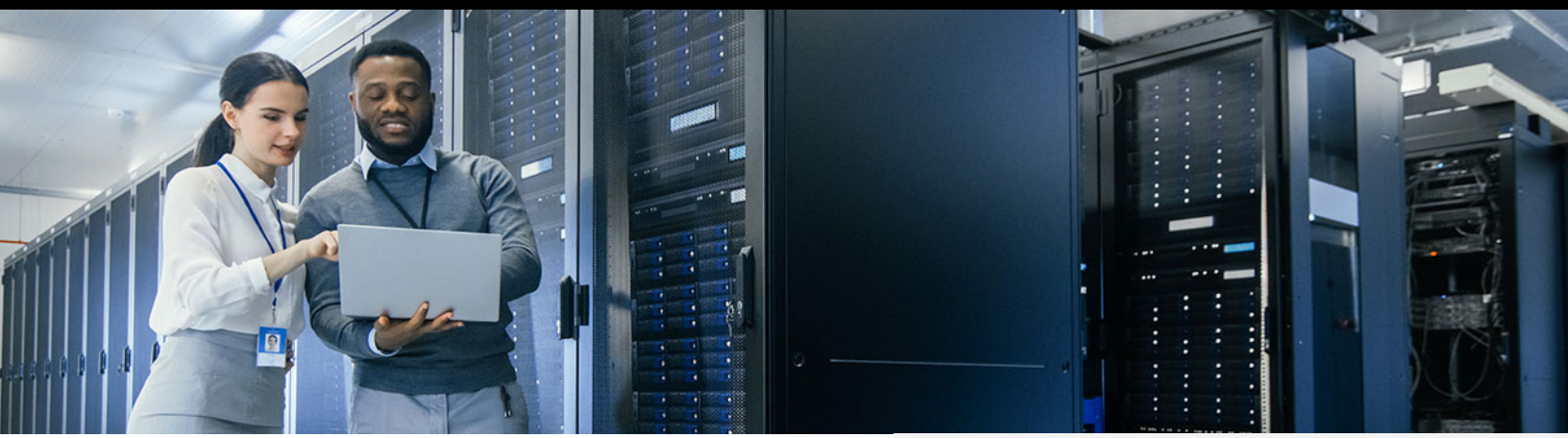
Micron® XTR NVMe™ SSD

U.3 NVMe



More cache for less cash.

Engineered to deliver extreme endurance that enables the reliable caching necessary for write-heavy workloads.

Many data center workloads can benefit from dedicated caching tiers for storage. In the past, this need was met with high-performance Intel® Optane™ SSDs, but the cancellation of Intel Optane technology[1] leaves an architectural gap for workloads and platforms that require higher endurance and lower read latency.

The Micron® XTR SSD fills this gap by solving the primary problem with Intel Optane technology: it was simply too expensive. The Micron XTR provides exceptional affordability by delivering 20% more usable capacity per drive, by consuming up to 44% less active power to help reduce operating costs, and by significantly lowering the cost of the underlying media.[2] With a vertically-integrated, industry-proven design, the Micron XTR delivers similar real-world endurance and performance as Intel Optane SSDs while improving supply fidelity.

The result? The Micron XTR provides significantly better value than Intel Optane SSDs.

Micron XTR SSD
U.3: 15mm

MICRON XTR: KEY BENEFITS

Reliable caching for the most write-heavy workloads[3]

- Up to 60 SDWPD (100% 128KB sequential write endurance)
- Up to 35 RDWPD (100% 4KB random write endurance)
- 10X more endurance than TLC-based SSDs
- Up to 35% of Intel Optane SSD endurance at 20% the cost
- Ideal for caching tiers, buffering, logging, journaling, OLTP, and other write-intensive workloads

Similar workload acceleration as the Intel Optane SSD[4]

- Nearly identical performance for Microsoft® SQL Server® analytics workloads:
  - Micron XTR + Micron 6500 ION SSD = 74-minute standard query run time
  - Intel Optane SSD + Micron 6500 ION SSD = 73-minute standard query run time
  - Delta = 1 minute (~1.3%)
- 44% lower active power consumption[5]
- 20% more usable capacity

Proven, vertically integrated storage architecture and industry-leading security instill confidence in data center deployments[6]

- Third-generation Micron Gen4 NVMe™ architecture for fast and easy qualification
- TAA-compliant SKUs with FIPS 140-3 L2 certifiability at ASIC level to help maximize security

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1. The supplier has announced that it is ceasing future development of their Optane products. See the following link for the announcement details: https://www.intel.com/content/www/us/en/support/articles/000091826/memory-and-storage.html. Intel® and Optane™ are trademarks of Intel Corporation or its subsidiaries.
2. Statements based on public pricing for the Intel Optane P5800X 1.6TB compared to NAND-based SSDs of similar capacity available at the time of this document's publication. Capacity Statement based on comparison of published usable capacities of the Micron XTR 1.92TB and the Intel Optane P5800X 1.6TB at the time of this document's publication. Unformatted. 1GB = 1 billion bytes. Formatted capacity is less. Based on public power consumption data for the Intel Optane P5800X 1.6TB, P5810X 800GB, P5800X 800GB and P5800X 3.2TB SSDs.
3. Statements based on public information at the time of this document's publication. Endurance statements refer to random DWPD endurance ratings for the Micron XTR 1.92TB, Intel Optane 1.6TB P5800X, and TLC NAND-based SSDs available on the open market.
4. Based on Micron comparison to and testing of the Intel Optane P5800X. See www.micron.com/XTR for additional details.
5. Based on public power consumption data for the Intel Optane P5800X 1.6TB.
6. 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, including those products that incorporate any of the mentioned security features.

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Delivers extreme endurance

Caching workloads demand extreme endurance ratings while budgets demand SSDs that are readily available at an approachable price point. The combination of Micron NAND and highly optimized firmware technology enables the Micron XTR to deliver 35 random drive writes per day (RDWPD) and 60 sequential drive writes per day (SDWPD), both of which exceed the typical TLC-based SSD endurance rating by 10X. By innovating with high-volume existing NAND technology, the Micron XTR achieves economies of scale that were never possible with Intel Optane SSDs.

Optimally accelerates storage workloads when paired with the Micron 6500 ION

Combining the Micron XTR with the Micron 6500 ION SSD accelerates demanding, write-heavy portions of workloads like caching and continuous logging, enabling the Micron XTR to easily withstand the most intense levels of write traffic. When paired with the Micron 6500 ION, the Micron XTR enables storage workloads to perform optimally and allows you to deploy more affordable all-flash storage configurations — the ideal combination of affordable caching and affordable capacity.

Workload Example	Deployment Example	Benefit
Data Analytics	Tempdb volume and log storage (numerous 4KB random writes)	Ample endurance for the write-intensive portions of demanding workloads like Microsoft SQL Server for analytics.[7]

Incorporates Micron's industry-proven, vertically integrated SSD technology

The Micron XTR leverages Micron's full vertical integration capabilities to bring industry-leading innovation — from the SSD's controller and firmware to Micron's leading NAND and DRAM. The Micron XTR combines Micron's stable architecture for NVMe data center SSDs with world-class front-end and back-end manufacturing and support, helping to streamline qualification and deployment across your data center.

Micron XTR Feature	Benefit
Supply Chain Fidelity	**Consistent supply availability:** Dual-sourced manufacturing sites and NAND from Micron's TAA-compliant fabrication facility strengthens supply chain fidelity by minimizing geographic-specific issues.
Vertically Integrated Design	**Improved qualification schedule:** Micron designed the controller, firmware, DRAM, and NAND to all work together with in-house validation to help ensure that each Micron XTR SSD is engineered to work seamlessly in your systems.
State-of-the-Art Security	**Secure storage:** Meet current and evolving security needs with options for FIPS 140-3 L2 (certifiable at the ASIC level for maximum security), TAA-compliance, TCG Opal 2.01 configurability, and host-based self-encrypting drive (SED) options. Hardware root of trust and chain of trust, DICE (device identification and measurement), SHA-512 (the strongest NIST-approved algorithm for security generation and firmware validation), and attestation (SPDM) ensure you get industry-leading security.

Micron XTR SSD Part Numbers

Micron XTR part number information is provided below for configuration-dependent values (shown in **bold**). Other part number values in the example part number are fixed. Visit micron.com/XTR for a list of valid part numbers.

MT FD K CC **1T9** T FR 1 BC **1** Z **HE** YY

Drive Capacity
- **960** = 960GB
- **1T9** = 1.92TB

Sector Size
- **1** = 512 bytes
- **4** = 4096 bytes

Feature Set
- **HE** = High Endurance
- **HF** = High Endurance with FIPS 140-3 L2 certifiability, TAA compliance, and SED Opal 2.01[8]

7. Micron XTR performance and endurance ratings exceed requirements for the tempdb storage volume with standard analytics benchmarks, based on Micron Data Center Workload Engineering team research.
8. SED = Self Encrypting Drive

Micron XTR Key Specifications

Micron XTR			
User Capacity		**960GB**	**1.92TB**
Performance[9] 128KB sequential transfers, 4KB random transfers	**Sequential Read** (MB/s, QD32)	6,800	6,800
	Sequential Write (MB/s, QD32)	5,300	5,600
	Random Read (IOPS, QD256)	900,000	900,000
	Random Write (IOPS, QD128)	250,000	350,000
	70/30 Random Read/Write (IOPS, QD128)	550,000	600,000
	Read Latency (µs, QD1, typical)[10]	60	60
	Write Latency (µs, QD1, typical)	15	15
Endurance by Workload[11]	**100% 128KB Sequential Write**	60 SDWPD (57TB per day)	60 SDWPD (115TB per day)
	100% 4KB Random Write	35 RDWPD (33TB per day)	35 RDWPD (67TB per day)
Power Consumption and Use[12] Active average, RMS 14W read / write maximum	**Read**	12W	
	Write	12W	
	Idle	5W	
	Operating Temperature	0° to 70C°	
Basic Attributes	**Interface**	PCIe Gen4 1x4 NVMe (v2.0)	
	NAND	Micron 176-layer 3D TLC NAND	
Reliability	**MTTF** (0-50°C)	2.5 million device hours	
	UBER	<1 sector per 10^{17} bits read	
	Warranty	5 years	

Note: All values provided are for reference only and are not warranted values. For warranty information, visit https://www.micron.com/support/sales-support/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. The endurance will vary by workload. Performance values measured at 14W.

9. Performance measured under the following conditions: Steady-state as defined by SNIA Solid State Storage Performance Test Specification Enterprise v1.1; Drive write cache enabled; NVMe power state 0; Sequential workloads measured using FIO with a 128K IO size and a queue depth of 32; Random read workloads measured using FIO with a 4K IO size and queue depth of 256; Random write workloads measured using FIO with a 4K IO size and a queue depth of 128.
10. Latency values measured with random workloads using FIO, 4KB transfers, queue depth = 1; Typical latency = median, 50th percentile.
11. Actual lifetime will vary by workload.
12. RMS = Root Mean Square.

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