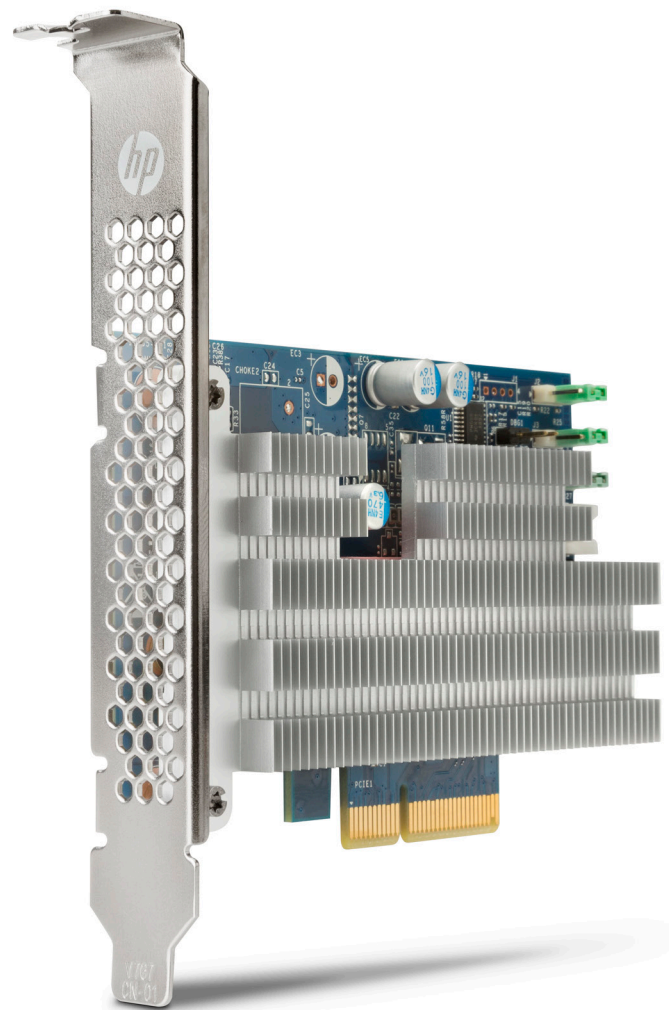


FAQs

# HP Z Turbo Drive G2



## Product performance/implementation

### What is the HP Z Turbo Drive SSD?

The HP Z Turbo Drive PCIe SSD is the family name for an M.2 PCIe connected SSD. The M.2 PCIe card used in the Z Turbo Drive requires a PCIe x4 slot for maximum performance. These new storage components are compatible with many HP Z Workstations. Please refer to our data sheets for the specific compatibility.

### What is new with the HP Z Turbo Drive G2 PCIe SSD?

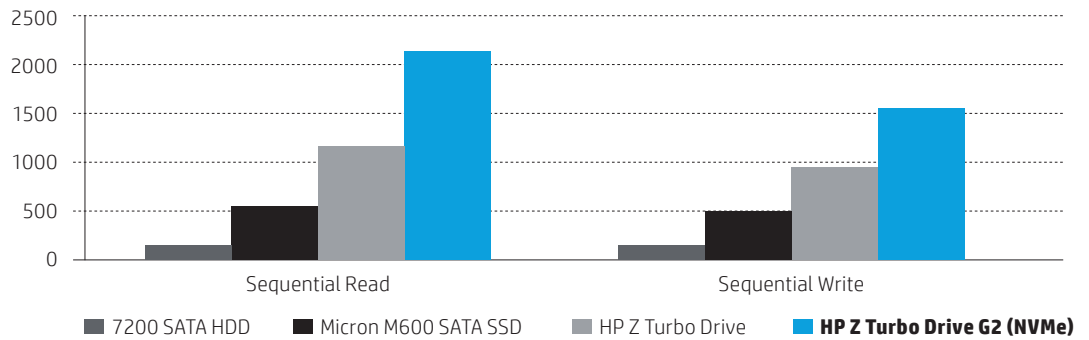
The new HP Z Turbo Drive G2 PCIe SSD incorporates SSD technology that uses PCIe Gen3 x4 for added bandwidth and roughly provides a 2x improvement in sequential performance. In addition, the SSD uses NVMe controller technology which provides a 3x improvement in Random Read performance.

### How does the performance of a PCIe SSD compare to a SATA SSD?

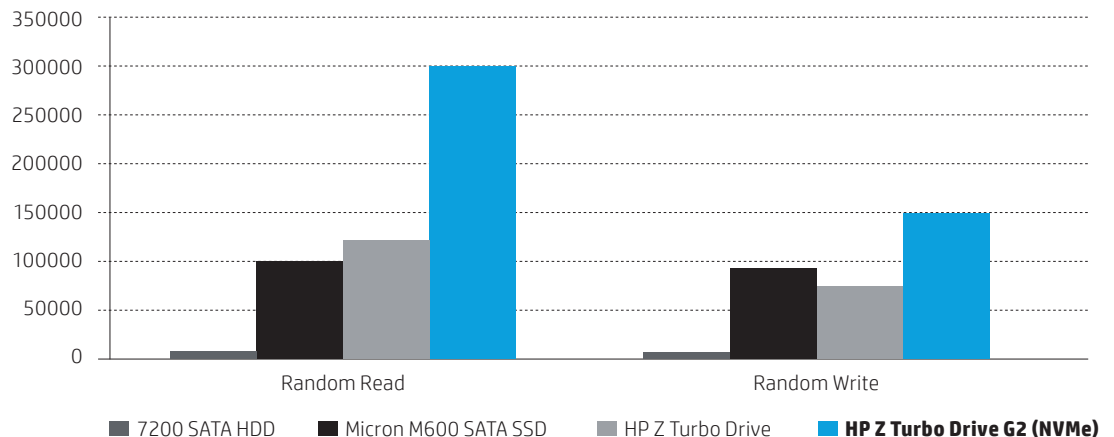
The new HP Z Turbo Drive G2 PCIe SSD significantly outperforms a standard SATA SSD. All SATA SSDs are limited by the 6 GB/s SATA bandwidth. The Sequential performance of the new HP Z Turbo Drive G2 PCIe SSD is 4x faster than a standard SATA SSD.

	HP Z Turbo Drive G2	HP Z Turbo Drive	SATA SSD	SATA 7200 HDD
<b>Sequential Read</b>	2150 MB/s	1,170 MB/s	550 MB/s	150 MB/s
<b>Sequential Write</b>	1550 MB/s	950 MB/s	500 MB/s	150 MB/s
<b>Random Read</b>	300K IOPS	122K IOPS	100K IOPS	0.46K IOPS

### Sequential R/W performance (MB/s)



### Random R/W performance (IOPS)



### Are there any significant differences when using an M.2 PCIe SSD as compared to a SATA SSD?

There are a couple of differences with respect to the storage driver requirements and RAID connectivity. There is a specific NVMe storage driver that is required. Also, the HP Z Turbo Drive does not use any of the onboard storage controllers, nor will it appear in any of the onboard storage controller option ROM utilities. Because the HP Z Turbo Drive does not use the onboard storage controllers, the drivers for the onboard storage controllers will not be used for the HP Z Turbo Drive.

**Is there a special driver that is required for the new HP Z Turbo Drive G2?**

Yes. NVMe devices require a driver for proper detection and operation. Microsoft Windows 8 and higher have an inbox NVMe driver. For Windows 7, HP recommends using the Microsoft NVMe Driver. This driver is supplied in two separate QFE's. KB2990941 must be installed first. After installation of KB2990941, KB3087873 must be installed. Also note that the new NVMe driver will not support the original HP Z Turbo Drive, which requires an AHCI driver.

For Linux®, the NVMe driver was merged into version 3.3 of the Linux kernel. See below for supported operating systems.

**What capacities are available with the new HP Z Turbo Drive G2?**

The new HP Z Turbo Drive G2 PCIe SSD is available in 256 GB<sup>1</sup>, 512 GB<sup>1</sup>, and 1 TB<sup>1</sup> capacities. We expect to be able to offer higher capacity devices in the future as they become available in the industry.

**What is the endurance rating of the HP Z Turbo Drive G2 in TBW (Total Bytes Written)?**

The MLC NAND used on the HP Z Turbo Drive is rated at 3,000 program / erase cycles. This level of endurance compares favourably to some of the SATA SSDs that we support in HP Z Workstations. The 256 GB<sup>1</sup> capacity version is specified at 146 TB<sup>1</sup> TBW (80 GB/day for 5 years), and the 512 GB<sup>1</sup> capacity version is specified at 292 TB<sup>1</sup> TBW (160 GB/day for 5 years).

**Which HP Z Workstation platforms will support the HP Z Turbo Drive G2?**

The HP Z Turbo Drive G2 is supported on the Z240, Z440, Z640, and Z840 Workstations. The Z240 supports one HP Z Turbo Drive in a native M.2 slot, and the second module is supported in a standard PCIe slot.

**Will the platforms support both HP Z Turbo Drive G2 and other SATA/SAS drives?**

Yes. We support many other storage components and controllers to enable various storage solutions. Most of these combinations are technically supported, yet not all of these component configurations and RAID support options are available from the factory.

**Is it possible to use the HP Z Turbo Drive G2 with add-in SAS controllers?**

It is technically feasible to support other SAS controllers in addition to the HP Z Turbo Drive, though they may not be available as factory supported configurations.

**Does the HP Z Turbo Drive have an OROM (Option ROM) for boot?**

The current M.2 modules supported do not have an OROM. If they did, the HP Z Workstation BIOS would disable the OROM on the M.2 module and use the integrated code in the BIOS to support booting from the HP Z Turbo Drive.

**What happens if OROM from my add-in storage controller causes issues booting from the HP Z Turbo Drive?**

If conflicts are discovered between an external OROM and the HP Z Turbo Drive through the BIOS, disable the OROM for the slot where the add-in storage controller resides.

**Can you use this drive as a boot device?**

There are no restrictions when using the HP Z Turbo Drive as a single boot device. It is not supported to use the HP Z Turbo Drive G2 in a RAID array as a boot on the Z440, Z640 and Z840. RAIDed boot of OS partitions can be created based on the limitations of the SW RAID capability supported in the OS on the Z440, Z640 and Z840. RAIDing of the boot partition is not supported on the Z440, Z640 and Z840. RAIDing of the boot partition is supported on the Z240 by using PCH lane remapping.

**Can I add multiple drives to my system? Can I RAID the drives?**

Yes. The technical requirement is for each device to be able to plug into a PCIe slot that supports Gen3 x4. The maximum number of drives supported is constrained by the available PCIe slots. When adding multiple devices to a system, the jumper switches need to be adjusted to enable the BIOS to uniquely identify each device. See the installation guide for more details. For RAID support, there are some specific differences and thus restrictions as compared to SATA/SAS HDDs or SSDs. Software RAID is used, as there is not a good solution today for hardware based RAID. See the table below for support details.

**Software RAID support with Z Turbo Drive PCIe SSD**

	<b>Boot configuration</b>	<b>Data configuration (non-boot)</b>
<b>PCH Lane remapping (Z240 only)</b>	RAID 0 RAID 1	RAID 0 RAID 1
<b>Windows RAID</b>	Limited support – RAID 1* No support – RAID 0, 5, 10	Supports RAID 0, 1 No support – RAID 5, 10
<b>Linux</b>	Functional** – RAID 0, 1* No support – RAID 5, 10	Functional** – RAID 0, 1, 5, 10

\*RAID 1 can be set up, yet will not provide complete, redundant protection as the boot partition is not replicated on both drives. An OS boot partition cannot be protected by software RAID 1.

\*\* Limited testing has been done with Linux to confirm RAID support and performance characteristics.

Factory/ordering support:

- HP Z240 Workstation: up to 2 drives
- HP Z440 Workstation: up to 2 drives
- HP Z640 Workstation: up to 2 drives
- HP Z840 Workstation: up to 2 drives

**Will the platforms support both HP Z Turbo Drive G2 (NVMe) and the AHCI version of HP Z Turbo Drive?**

Yes. We will not support mixing of the drives as a factory configuration, and we do not recommend or support RAID with the different versions.

**Which PCIe slots support the HP Z Turbo Drive G2?**

For all HP Workstation platforms the tested and approved slots for the HP Z Turbo Drive G2 are as follows (in order of preference):

HP Z840: Single card configuration: Slot 1, Slot 6, Slots 3 & 4 (requires 2nd CPU)

HP Z840: Dual or more card configuration: Slots 1 & 6, Slots 3 & 4 (requires 2nd CPU), Slots 1, 3, 4, or 6 (requires 2nd CPU)

HP Z640: Slot 4, Slot 5

HP Z440: Slot 4, Slot 5

HP Z240 Tower: Native M.2 Slot, PCIe Slot 3

HP Z240 SFF: Native M.2 Slot, PCIe Slot 4

**How do I reimagine my system with the HP Z Turbo Drive G2?**

If the HP Z Turbo Drive G2 is purchased as an AMO kit, HP recommends as a standard procedure that the machine be restored to the factory configuration prior to restoring the system. That would mean the Z Turbo Drive G2 would need to be removed prior to restoring the system with restore media or HDD recovery. If the system is purchased with the Z Turbo Drive G2, it would not need to be removed prior to restoring the system. If the Z Turbo Drive is being added as a storage device/data drive, then the process involves following the installation guide. The summary of the process is to ensure/update correct BIOS, install the card, and load driver.

**Which operating systems are supported?**

The HP Z Turbo Drive is supported with the following operating systems by HP Workstations: Windows 7 64, Windows 8.1 64, Windows 10 64, RHEL 6, SLED 11 SP3, Ubuntu 14.04.

**Is there a specific BIOS required to use the HP Z Turbo Drive G2?**

Yes. Minimum BIOS revision of 1.53 for HP Z440, Z640, and Z840 Workstations. The Z240 was released with support for Z Turbo Drive G2, thus there is no BIOS minimum for this platform.

**Will the HP Z Turbo Drive G2 be supported with HP Performance Advisor?**

Yes. HP Performance Advisor will recognise all installed HP Z Turbo Drives. The newer technology NVMe cards, including the HP Z Turbo Drive G2, do not currently expose the SMART attributes used by HP Performance Advisor to calculate and report wear level and life expectancy information. We hope to provide this additional information if/when the capability to extract this information is added to the disk controller driver.

**Are there any additional thermal concerns when using the HP Z Turbo Drive G2?**

No. The internal cooling solution within the HP Workstation desktop platforms will allow the HP Z Turbo Drive G2 to operate over a broad temperature range without throttling down the performance.

**Does the HP Z Turbo Drive G2 support hardware encryption?**

The HP Z Turbo Drive does not yet support hardware encryption. It is possible that future products would be released with hardware encryption features.

**Does the HP Z Turbo Drive G2 have the ability to do Secure Erase?**

Yes. The HP Z Turbo Drive G2 does support Secure Erase.

**Can I use the HP Z Turbo Drive G2 in other HP Systems?**

The HP Z Turbo Drive has been developed exclusively for support in the supported HP Z Workstation platforms. Other HP platforms may provide support at a later date.

**Can I use the HP Z Turbo Drive G2 in other non-HP Systems?**

No. The HP Z Turbo Drive has been engineered and qualified exclusively to support demanding HP Workstation users and their workflows.

<sup>1</sup> For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB of system disk is reserved for system recovery software.

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