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Application note – How to use M.2 NVMe SSD storage in Airtop

Introduction

The ongoing dramatic improvement in the area of storage technology, constantly pushes devices manufacturers to innovate and present new form-factors and signaling technology storage solutions. The disruption in the storage market segment takes place, older technologies become less and less popular, while the new gain their popularity among customers. Longer development cycles of computers and motherboards over storage devices, make computer manufacturers to keep their designs with initial bulletproof and tested technology. Nevertheless, a wide range of adapter boards exist and allows the needed conversion.

M.2 NVMe SSD and M.2 PCIe SSD

Type of solid state storage device in M.2 electro-mechanical form-factor which is using PCI Express bus (NVMe) to get access, via dedicated controller, to non-volatile NAND flash media, instead of SATA or SAS interfaces (AHCI). The method allows to increase computers' Core-to-Peripheral data throughputs and overall performance.

NVMe is a standardized technology in terms of SW and drivers compatibility, while PCIe is an earlier variant and is vendor specific.

Note: Other form-factors of PCIe/NVMe storage exist but they are out of scope of this document.

Airtop

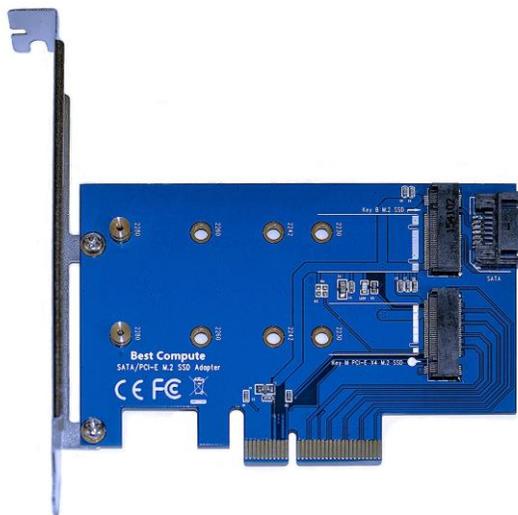
Airtop supports installation of most popular storage devices on the market today, 2.5" HDD/SSD drives, mSATA SSD drives and M.2 SATA SSD drives. All are SATA based (SATA3.0 capable, up to 6 Gbps) and do not support PCI Express.

Also, Airtop features the PEG - PCI Express Graphics port, reside directly in the processor and consist of 3x independent PCIe controllers, allowing connection of up to x16 PCI Express lanes in various configurations. Connection to PEG implemented via standard full size x16 PCIe edge connector.

The use of NVMe and PCIe storage devices possible via simple and not expensive (~ \$15-\$20) adapters between Airtop full size PCIe slot and M.2 NVMe/PCIe storage drives.

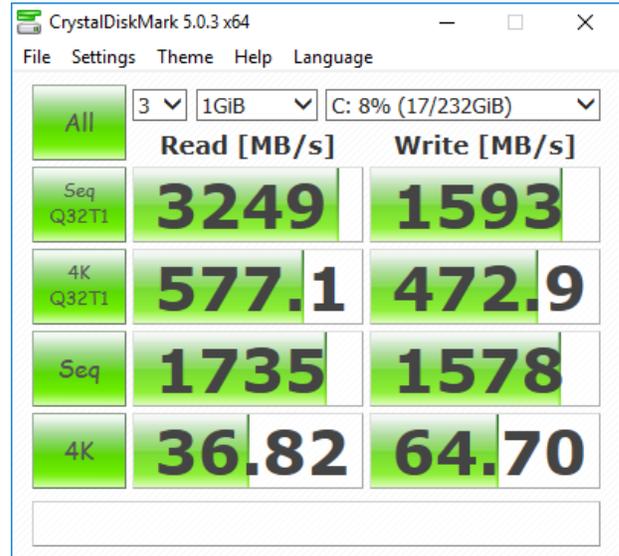
We've been testing the following equipment on Airtop:

- Best Compute adapter: <https://www.amazon.com/Best-Compute-PCIe-SATA-Adapter/dp/B01E8A6SLC>
- Samsung 960 EVO (250 GB) M.2 NVMe SSD
- PCIe x4 (Gen. 3)



Performance results

Read/write performance results:



	Read [MB/s]	Write [MB/s]
All	3249	1593
Seq Q32T1	3249	1593
4K Q32T1	577.1	472.9
Seq	1735	1578
4K	36.82	64.70

Other examples

Examples of other adapters that were not verified in Compulab:

- Addonics Technologies: <http://www.addonics.com/products/adm2px4.php>
- Plextor: <https://www.amazon.co.uk/Plextor-PX-AG512M6E-512GB-PCI-Express-Adapter/dp/B00J69VMCG>



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