CRUSHING BOTTLENECKS WITH PCI EXPRESS® 4.0

Advantages Explained.

AMD **PCI EXPRESS®**

PCI Express® Explained

What exactly is PCI Express (or PCIe®) and how does it impact a modern, professional workstation? The acronym stands for Peripheral Component Interconnect Express, which is a technical way of describing a common, general-purpose interface (or bus) on a motherboard for connecting add-on devices. This is often called a 'slot' on the motherboard. Slots allow you to customize workstations with task-oriented components such as Wi-Fi adapters, hard drives and, perhaps most importantly for this discussion, graphics cards (GPUs).

Insight into the Architecture

Found in virtually all modern mobile and desktop computers, PCIe stretches across all hardware architectures from gaming, to high-performance datacenter servers. Think of the 'bus' as the link between a peripheral device, the host computer and other PCIe devices within the same system. One example might be reading a high-resolution digital image off a storage device and displaying it on a GPU-driven display. The transfer bandwidth needs of these devices vary, but the various requirements are addressed by PCIe 'lanes', which define potential bandwidth and transfer rates between different devices.
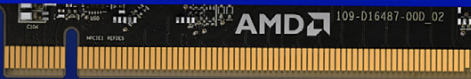
PCIe Interface Connector on the High-Performing AMD Radeon™ PRO W6800 GPU.

Understanding Lanes

PCIe lanes dictate how much data can potentially be sent or received by a device, which can contain from 1 to 16 lanes, doubling with each progressive step from 1,2, 4, 8, or 16 lanes. A simple analogy would be the amount of water able to flow through larger pipes or how many cars can travel down a multi-lane highway as opposed to a single lane track. More lanes equate to higher data transfer and greater overall bandwidth, which is why different add in cards may require more PCIe lanes. Modern GPU's typically require a 16-lane slot due to the demanding nature of the calculations involved in content creation and driving pixels to one or more displays. This is typically represented as "PCIe 4.0 x16".

Professional Use Examples

Consider two broad user personas of 01/ a Video Editor and 02/ a 3D Content Designer. The common tasks of loading, displaying, and saving large projects off the hard drive are performed countless times throughout the workday. The last thing anyone wants to be thinking about is the math involved calculating the available bandwidth of a hard drive or a graphics card.

01 For Video Editors, there is an exponential bandwidth demand on the system as projects move from HD to 4K and 8K, as well as when source footage is captured in a higher color space using modern digital cameras.

02 For anyone working in 3D, there is a similar overhead for massive 3D polygonal datasets or for high-resolution texture maps. Your workstation should accommodate these decisions in real-time, without slowing down the creative process, and this is precisely where moving to PCIe 4.0 can be a simple decision.

AMD RADEON PRO | **Professional Graphics for Exceptional Performance with Reliability, Stability and Software Certifications at its Core.**

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Increasing the Performance

Introduced in 2003, PCIe 1.0 replaced older motherboard bus types such as AGP, PCI and PCI-X and quickly became the industry standard by introducing planned, generational enhancements from the outset. Typically each generation offers 2x the transfer rate of the previous, so when considering PCIe 4.0 over its 3.0 Gen predecessor, users can be confident of up to twice the available performance as previous generation and up to sixteen times that of the first generation.

Lanes	PCIe 1.0	PCIe 2.0	PCIe 3.0	PCIe 4.0
X1	250 MB/sec	500 MB/sec	1 GB/sec	2 GB/sec
X2	500 MB/sec	1 GB/sec	2 GB/sec	4 GB/sec
X4	1 GB/sec	2 GB/sec	4 GB/sec	8 GB/sec
X8	2 GB/sec	4 GB/sec	8 GB/sec	16 GB/sec
X16	4 GB/sec	8 GB/sec	16 GB/sec	32 GB/sec

Generational Performance Gains of PCIe Versions. Rounded to the nearest value.
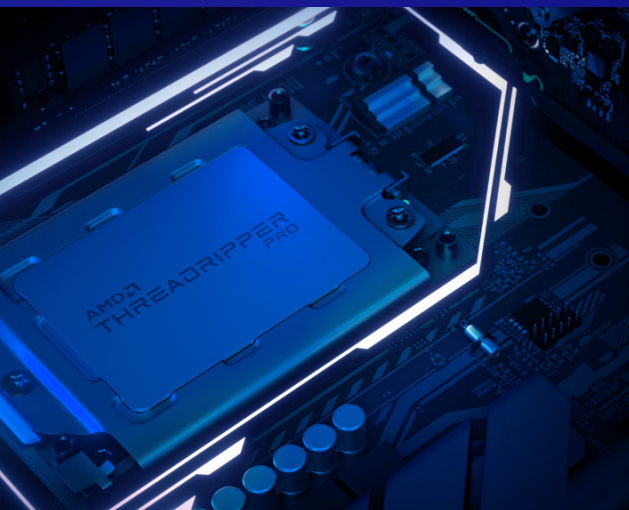
Created for the Professional User

Professionals have countless choices when it comes to the components that make up a modern high-performing workstation and choosing the right solution is not always a single decision. AMD continues to lead the way by being the first to introduce the latest generation of technologies built around PCIe Gen 4.0 in our consumer and professional processor and graphics series.

The AMD Ryzen™ Threadripper™ PRO family of processors all accommodate up to 128x PCIe 4.0 lanes and AMD Radeon PRO graphics was the first professional GPU to market with a 16-lane, PCIe 4.0 graphics solution with all the expected certifications required by the professional user.

Selecting the Correct GPU

Most modern AMD Professional GPUs support the PCIe 4.0 standard.

The new AMD Radeon PRO W6800, with its dedicated hardware-based raytracing, AMD RDNA™ 2 architecture and 32 GB of memory, is ideal for working with huge datasets and high resolution imagery.

AMD RADEON PRO W6800

Learn more about VR capabilities of Radeon PRO Graphics at **amd.com/PRO-VR**

RADEON PRO **W6800** GRAPHICS

LATEST PCIe 4.0 SUPPORT, WITH 3.0 BACKWARD COMPATIBILITY
Gigantic 32 GB of GDDR6 Memory.
Error Correcting Code (ECC) Support.
Six Display Outputs. 8K, HDR Support.
Remote Environment[1] Ready.

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To learn more about AMD professional graphics visit: **amd.com/RadeonPRO**