NVIDIA Quadro P4000

NEW

NVIDIA Quadro P4000
Part No. VCQP4000-PB

Where to Buy | Commercial Sales

Overview

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UNMATCHED POWER. UNMATCHED CREATIVE FREEDOM.

NVIDIA QUADRO P4000—THE WORLD'S MOST POWERFUL SINGLE SLOT PROFESSIONAL GRAPHICS CARD.

The new NVIDIA VR Ready Quadro P4000 combines a 1792 CUDA Core Pascal GPU, large 8GB GDDR5 memory and advanced display technologies to deliver the performance and features that are required by demanding professional applications. The ability to create an expansive visual workspace of up to four 5K displays (5120 x 2880 at 60Hz) with HDR color support lets you view your creations in stunning detail. The P4000 is specially designed with the performance necessary to drive immersive VR environments. Additionally, you can create massive digital signage solutions by connecting multiple P4000s via Quadro Sync II.

Designs become more complex over time. Visual effects grow in size, complexity, and scope. Scientific visualization and compute problems continue to push the boundaries of workstation capabilities. VR is changing all facets of entertainment, design, engineering, architecture, and medicine. As professional workflows grow in size and complexity, the demand for visual compute power grows with it.

The new Quadro P4000 combines the latest GPU architecture and display technologies to deliver the best performance and features available in a single slot professional graphics card solution. The P4000 enables users to create large, complex designs, render detailed photo realistic imagery, and create detailed, lifelike VR experiences.

CUDA Cores	1792
Peak Single Precision FP32 Performance	5.3 TFLOPS
GPU Memory	8 GB GDDR5
Memory Interface	256-bit
Memory Bandwidth	243 GB/s
System Interface	PCI Express 3.0 x16
Display Connectors	DP 1.4 (4) + Stereo

MANUFACTURING SOLUTIONS

> Designers and engineers can create models with larger assemblies and larger numbers of components, render with higher image quality, or resolution.

> Quadro P4000 supports multiple displays at up to 5K or even 8K resolution.

> Use real-world physics, lighting, and materials during interactive design and visualize with photo-realistic image quality.

> Integrate simulation during design with finer time-steps, more depth of field, larger assemblies, and more detail in components.

> NVIDIA Iray plug-ins enable designers to visualize designs with photorealistic image quality using physically based lights and materials as an integrated part of their workflow.

> Combine multiple P4000 cards to provide incredible rendering power for larger, more demanding rendering workloads.

> Pascal's simultaneous multi-projection feature brings VR-based virtual prototyping to the next level. Larger, more complex designs can be experienced at scale, complete with virtual audio and touch integration.

MEDIA & ENTERTAINMENT FEATURES AND BENEFITS

> Editors can work in real time with HDR content and up to 8K resolution on more complex projects with more layers and effects.

> Animators can create complex simulations and interactive visual effects. This includes building larger scenes with greater numbers of 3D elements—all fitting in graphics memory.

> 3D texture painting artists can enjoy more creative flexibility in their workflow by keeping a large number of textures and assets in graphics memory.

> Visual effects artists can create the more complex special effects, maintaining a large number of assets in graphics memory and streamlining the effects workflow.

> GPU-powered rendering lets artists visualize creations with photorealistic image quality using application-based, GPU-accelerated rendering or with NVIDIA Iray plug-ins using physically based lights and materials.

> Create and play back ultra-high quality HDR content with H.264/HEVC encode and decode engines.

> Quadro P4000 brings new levels of VR content-creation power in a single-slot form factor, for more complex, detailed, and lifelike VR experiences.

AEC SOLUTIONS

> Architects can create complex models—including designing, conducting analysis, and making detailed walkthroughs of structures with greater levels of realism.

> Plant designers can create complex plant designs and conduct verifications and walkthroughs.

> Urban designers can create large models with more detail and complexity.

> Powered by the P4000, VR-enabled walkthroughs allow customers to experience buildings at scale, providing instant feedback on designs, colors, textures, and features, and reducing costly rework once construction has begun.

IMMERSIVE VISUALIZATION FEATURES AND BENEFITS

> Drive more complex, lifelike HMD-based VR experiences by taking advantage of the P4000's VR-specific GPU hardware.

> Synchronize the output of multiple P4000s with Quadro Sync II to create massive multi-display solutions.

> NVIDIA MOSAIC technology, combined with the P4000, enables seamless multi-projector implementations.

VISUAL SIMULATION FEATURES AND BENEFITS

> The P4000 features 8 GB of GDDR5 memory to enable realistic simulations covering large geographic areas with greater detail.

> Connect multiple displays or projectors to create 360° field of view.

> Quadro Sync II can connect multiple P4000 cards and workstations for massive multi-display and multi-projector simulation environments.

GPU PERFORMANCE FEATURES

Pascal GPU Architecture

Based on state-of-the-art 16nm FinFET Plus process technology to pack over 7 billion transistors and 1792 CUDA cores and up to 5.3 TFLOPS of single precision compute power. The Quadro P4000 graphics board is the industry's most dominant single-slot form factor graphics board for computationally demanding design visualization or immersive design reviews. Get real interactive experience with today's demanding professional workflows.

Simultaneous Multi-Projection

Complete stereo rendering of geometry in a single pass to double the effective throughput for applications such as VR.

Pascal Dynamic Load Balancing

Dynamically allocate GPU resources for graphics and compute tasks as needed to maximize resource utilization.

Pascal Graphics Preemption

First ever pixel level preemption provides more granular control to better support time-sensitive tasks such as VR motion tracking.

Pascal Compute Preemption

Preemption at the thread and instruction level provides finer grain control over compute tasks.

H.264 and HEVC Encode/Decode Engines

Deliver faster than realtime performance for transcoding, video editing, and other encoding applications with one dedicated H.264 and HEVC encode engines and a dedicated decode engine that are independent of 3D/compute pipeline.

NVIDIA GPU Boost 3.0

Achieve higher application performance without exceeding the power and thermal envelope of the board. Pascal GPU technology maximizes the boost potential of the GPU.

IMAGE QUALITY FEATURES

Full-Scene Antialiasing (FSAA)

Dramatically reduce visual aliasing artifacts or "jaggies" with up to 64X FSAA (128X with SLI) for unparalleled image quality and highly realistic scenes.

16K Texture and Render Processing

Texture from and render to 16K x 16K surfaces to support applications that demand the highest resolution and quality image processing.

Pascal Memory Compression

Increase bandwidth by up to 20% by reducing the amount of data fetched from memory for each frame with fourth generation, lossless delta compression.

DISPLAY FEATURES

NVIDIA Quadro MOSAIC Technology

Transparently scale the desktop and applications across up to 4 GPUs and 16 displays from a single workstation while delivering full performance and image quality.

NVIDIA Quadro Sync II

Synchronize the display and image output of up to 32 displays from 8 GPUs (connected through two Sync II boards) in a single workstation, reducing the number of machines needed to create an advanced visualization environment. Each frame lock cable is designed with a self-locking retention mechanism to secure its connection with the frame lock connector to provide robust connectivity and maximum productivity. P4000 + Quadro Sync II turnkey bundles are available. 32 display support requires a software update. Until then a maximum of 16 displays can be supported.

DisplayPort 1.4

Support up to four 5K monitors at 60Hz, or dual 8K displays per card. The P4000 supports HDR color for 4K at 60Hz for 10/12b HEVC decode and up to 4K at 60Hz for 10b HEVC encode. Each DisplayPort connector is capable of driving ultra-high resolutions of 4096x2160 at 120 Hz with 30-bit color.

HDR Ready

Built in compatibility with High Dynamic Range (HDR) TV's and Display devices (Windows only), whether it's a custom application or video, which will be accelerated by the on chip 4K at 60Hz 10bpp HEVC decode or up to 4K at 60Hz for 10bpp HEVC encode.

NVIDIA NVIEW Advanced Desktop Software

Gain unprecedented end-user control of the desktop experience for increased productivity in single large display or multi-display environments.

OpenGL Quad Buffered Stereo Support

Provide a smooth and immersive 3D Stereo experience for professional applications.

Ultra High Resolution Desktop Support

Get more MOSAIC topology choices with high resolution displays devices with a 32K Max desktop size.

Professional 3D Stereo Synchronization

Robust control of stereo effects through a dedicated connection to directly synchronize 3D stereo hardware to a Quadro graphics card.

SOFTWARE SUPPORT

NVIDIA CUDA Parallel Computing Platform

Natively execute standard programming languages like C/C++ and Fortran, and APIs such as OpenCL, OpenACC and Direct Compute to accelerate techniques such as ray tracing, video and image processing, and computation fluid dynamics.

NVIDIA GPUDirect for Video

GPUDirect for Video speeds communication between the GPU and video I/O devices by avoiding unnecessary system memory copies and CPU overhead.

NVIDIA Enterprise-Management Tools

Maximize system uptime, seamlessly manage wide-scale deployments and remotely control graphics and display settings for efficient operations.

NVIDIA Multi-GPU Technology

Combine the visualization and interactive design capability of multiple GPUs by leveraging a mix of Quadro GPUs to dramatically improve the production workflow.

NVIDIA SLI HB Technology

Leverage multiple P4000 GPUs to dynamically scale graphics performance, enhance image quality, expand display real estate, and assemble a fully virtualized system. 5K resolution in SLI mode supported.

SUPPORTED PLATFORMS

> Microsoft Windows 10 (64- and 32-bit)
> Microsoft Windows 8.1 and 8 (64- and 32-bit)
> Microsoft Windows 7 (64- and 32-bit)
> Microsoft Windows Server 2008 (64- and 32-bit)
> Microsoft Windows Server 2012
> Microsoft Windows Server 2012 R2 64
> Microsoft Windows Server 2016
> Linux – Full OpenGL implementation, complete with NVIDIA and ARB extensions (64- and 32-bit)

MINIMUM SYSTEM HARDWARE REQUIREMENTS

> Intel Core i5, i7, Xeon or later
> AMD Phenom or Opteron-class or later
> PCIe x16 Gen 3 (preferred) expansion slot
> 2 GB or more of system memory, 8 GB recommended
> 200MB of available disk space for full driver installation
> Blu-ray or DVD-ROM drive
> Internet connection (if preferred for driver installation)
> DisplayPort (preferred) or DVI compatible displays
> HDMI display(s) with purchase of optional DP to HDMI adapter(s)

3D GRAPHICS ARCHITECTURE

> Scalable geometry architecture
> Hardware tessellation engine
> NVIDIA GigaThread engine with dual copy engines
> Shader Model 5.1 (OpenGL 4.5 and DirectX 12)
> Up to 16 K x 16 K texture and render processing
> Transparent multisampling and super sampling
> 16x angle independent anisotropic filtering
> 32-bit per-component floating point texture filtering and blending
> 64x full scene antialiasing (FSAA)/128x FSAA in NVIDIA SLI Mode
> Decode acceleration for MPEG-2, MPEG-4 Part 2 Advanced Simple Profile, H.264, HEVC, MVC, and VC1
> Dedicated H.264 and HEVC encoder
> Blu-ray dual-stream hardware acceleration (supporting HD picture-in-picture playback)
> NVIDIA GPU Boost (automatically improves GPU engine throughput to

SPECIFICATIONS

CUDA Cores	1792
Peak Single Precision FP32 Performance	5.3 TFLOPS
Multi-GPU Scalability	NVIDIA SLI HB
GPU Memory	8 GB GDDR5
Memory Interface	256-bit
Memory Bandwidth	243 GB/s
System Interface	PCI Express 3.0 x16
Maximum Power Consumption	105 W
Energy Star Enabling	Yes
Thermal Solution	Ultra-quiet active fansink
Form Factor	4.40" H x 9.50" L, Single Slot
Display Connectors	DP 1.4 (4) + Stereo
DisplayPort with Audio	Yes
DVI-D Single-Link Connector	Via included adapter
HDMI Support	Via optional adapters
VGA Support	Via optional adapters
Number of Displays Supported	4
Maximum DP 1.4 Resolution	HDR 5120 x 2880 at 60Hz (30-bit color)
5K Display Support	HDR 5120 x 2880 at 60Hz (30-bit color)
4K Display Support	HDR 4096 x 2160 at 60Hz or 3840 x 2160 at 60Hz
Maximum DVI-D DL Resolution	2560 x 1600 at 60Hz via 3rd party adapter
Maximum DVI-D SL Resolution	1920 x 1200 at 60Hz via included adapter
HDCP Support	Yes
Professional 3D Support	Yes, via included stereo connector bracket
Quadro Sync II Compatible	Yes (Frame Lock and Genlock)
NVIDIA GPU Direct Compatible	Yes

maximize application performance.

NVIDIA CUDA PARALLEL PROCESSING ARCHITECTURE

> Pascal SM Architecture (streaming multi-processor design that delivers greater processing efficiency)

> Dynamic Parallelism (GPU dynamically spawns new threads without going back to the CPU)

> API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran

> 96 KB of RAM (dedicated shared memory per SM)

ADVANCED DISPLAY FEATURES

> Support for any combination of four connected displays

> Four DisplayPort 1.4 outputs (supporting resolutions such as 3840 x 2160 at 120 Hz and 5120 x 2880 at 60 Hz)

> DisplayPort to VGA, DisplayPort to DVI (single-link and dual-link), and DisplayPort to HDMI cables (resolution support based on dongle specifications)

> HDR support over DisplayPort 1.4 (SMPTE 2084/2086, BT. 2020) (4K at 60 Hz 10b/12b HEVC Decode, 4K at 60 Hz 10b HEVC Encode)

> HDCP 2.2 support over DisplayPort, DVI, and HDMI connectors

> 12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)

> NVIDIA 3D Vision technology, 3D DLP, Interleaved, and other 3D stereo format support

> Full OpenGL quad buffered stereo support

> Underscan/overscan compensation and hardware scaling

> NVIDIA NVIEW multi-display technology

> Support for large-scale, ultra-high resolution visualization using the NVIDIA SVS platform, which includes NVIDIA MOSAIC, NVIDIA Sync and NVIDIA Warp/Blend technologies

> Turnkey Quadro P4000 + Quadro Sync II bundles available

DISPLAYPORT AND HDMI DIGITAL AUDIO

> Support for the following audio modes: Dolby Digital (AC3), DTS 5.1, Multi-channel (7.1) LPCM, Dolby Digital Plus (DD+), and MPEG-2/MPEG-4 AAC

> Data rates of 44.1 KHz, 48 KHz, 88.2 KHz, 96 KHz, 176 KHz, and 192 KHz

> Word sizes of 16-bit, 20-bit, and 24-bit

Graphics APIs	**Shader Model 5.1, OpenGL 4.5, DirectX 12.0, Vulkan 1.0**
Compute APIs	**CUDA, DirectCompute, OpenCL**
NVIEW	**Yes**
NVIDIA MOSAIC	**Yes (Windows 10, 8.1, 8, 7, and Linux)**
Warranty	**3 Years**

PACKAGE CONTAINS

> NVIDIA Quadro P4000 professional graphics board

> Stereo connector bracket

> DisplayPort to DVI-D SL adapter

> Auxiliary power cable

> Software installation disc for Windows 10, 8.1, 8, and 7 (64- and 32-bit)

> Printed Quick Start Guide

AVAILABLE ACCESSORIES

> NVIDIA SLI HB Technology Kit Leverage multiple GPUs to dynamically scale graphics performance, enhance image quality, expand display real estate, and assemble a fully virtualized system. 5K resolution in SLI mode supported. Order PNY Part Number HBSLIBRIDGE-2W2S-KIT.

> Connect the Quadro P4000 to HDMI displays at resolutions up to 4K with PNY Part Number DP-HDMI-FOUR-PCK. The four included DisplayPort to HDMI adapters are recommended by NVIDIA, provide outstanding image quality, and are built to professional standards.

WARRANTY & SUPPORT

PNY provides unsurpassed service and commitment to its professional graphics customers offering: 3-year warranty, free pre- and post-sales support, dedicated Quadro Field Application engineers and direct tech support hot lines. In addition, PNY delivers a complete solution including the appropriate adapters, cables, brackets, software installation disc and documentation to ensure a quick and successful install.

> 3-year warranty

> Free dedicated phone and email technical support (1-800-230-0130)

> Dedicated Quadro Field Application Engineers

RESOURCES

> Product Brochure

> Quadro Comparison

> Quadro Configurator

Contact Us
Product Recall
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