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NVIDIA® Quadro® M2000
Part No. VCQM2000-PB

Overview

NVIDIA Quadro M2000—The Perfect Balance of Superb Performance, Compelling Features, and Compact Form Factor

The Quadro M2000 delivers an incredible creative experience across a broad range of professional 3D applications. This advanced graphics board features an NVIDIA Maxwell™-based GPU, 4 GB of ultra-fast on-board memory and the power to drive four 4K displays natively. This makes it an excellent choice for accelerating product development and content creation workflows that demand fluid interactivity with complex models and scenes. Creative professionals can tap into this increased performance – as well as hardware HEVC encode and decode engines—to accelerate both creation and playback of HEVC content.

Designed and built specifically for professional workstations, NVIDIA Quadro GPUs power more than 100 professional applications across a broad range of industries including manufacturing, media and entertainment, sciences, and energy. Professionals trust them to realize their most ambitious visions—whether its product design, visualization and simulation, or spectacular visual storytelling—and get results to market faster.

CUDA Cores	768
GPU Memory	4GB GDDR5
Memory Interface	128-bit
Memory Bandwidth	106 GB/s
System Interface	PCI Express 3.0 x16
Display Connectors	DP 1.2 (4)
DisplayPort 1.2	Yes
Warranty	3 Years
PNY Part Number	VCQM2000-PB

PNY provides unsurpassed service and commitment to its professional graphics customers offering: 3-year warranty, 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.

Specifications

CUDA Cores	768
GPU Memory	4GB GDDR5
Memory Interface	128-bit
Memory Bandwidth	106 GB/s
System Interface	PCI Express 3.0 x16
Maximum Power Consumption	75 W
Energy Star Enabling	Yes
Thermal Solution	Ultra-quiet active fansink
Form Factor	4.376” H x 6.6” L, Single Slot
Display Connectors	DP 1.2 (4)
DisplayPort 1.2	Yes
DisplayPort with Audio	Yes
DVI-D Dual Link Connector	Via optional adapter
DVI-D Single-Link Connector	Via included adapter
Number of Displays Supported	4
Maximum DP 1.2 Resolution	4096 x 2160 at 60Hz
Maximum DVI-I DL Resolution	2560 x 1600 at 60Hz
Maximum DVI-I SL Resolution	1920 x 1200 at 60Hz
HDCP Support	Yes
Graphics APIs	Shader Model 5.0, OpenGL 4.5, DirectX 12
Compute APIs	CUDA, DirectCompute, OpenCL
NVIEW	Yes
NVIDIA Mosaic	Yes (Windows® 10, 8.1, 8, 7 , Vista® and Linux®)
Warranty	3 Years
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Minimum System Requirements

- Microsoft Windows® 10, 8.1, 8, 7, Linux®, or Solaris®
- 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, DVI, or VGA compatible display(s)

Package Contains

- NVIDIA Quadro M2000 professional graphics board
- DisplayPort to DVI-D SL adapter
- Software installation disc for Windows 10, 8.1, 8, and 7 (32- and 64-bit)
- Printed QuickStart Guide

3D Graphics Architecture

- Scalable geometry architecture
- Hardware tessellation engine
- Shader Model 5.0 (OpenGL 4.5 and DirectX 12)
- Up to 16K x 16K texture and render processing
- Transparent multisampling and super sampling
- 16x angle independent anisotropic filtering
- 128-bit floating point performance
- 32-bit per component floating point texture filtering and blending
- 64X full scene antialiasing
- Decode acceleration for MPEG-2, MPEG-4 Part 2 Advanced Simple Profile, H.264, MVC, VC1, DivX (version 3.11 and later), and Flash (10.1 and later)
- Dedicated H.264 encoder
- Blu-ray dual-stream hardware accelerating (supporting HD picture-in-picture playback)
- NVIDIA GPU Boost automatically adjusts the GPU engine throughput to maximize application performance.

Parallel Computing Capabilities

- SMM architecture (Maxwell streaming multi-processor design that delivers greater processing and efficiency)
- Dynamic Parallelism (GPU dynamically spans new threads without going back to the CPU)
- API support including: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
- 96KB of RAM (dedicated shard memory per SM)

Advanced Display Features

- Simultaneously drive up to four displays when connected natively
- Four DisplayPort 1.2 outputs (supporting resolutions such as 4096x2160 @ 60Hz)

- DisplayPort to VGA, DisplayPort to DVI (single-link and dual-link) and DisplayPort to HDMI cables (resolution support based on dongle specifications)
- HDCP 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
- Support for NVIDIA Quadro Mosaic, NVIDIA nView multi-display technology, NVIDIA Enterprise Management Tools

DisplayPort and HDMI Digital Audio

- 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, 176KHz, and 192 KHz
- Word sizes of 16-bit, 20-bit, and 24-bit

Features and Benefits

GPU FEATURES

Maxwell Streaming Multiprocessor
The heart of Maxwell's power efficient performance is its newly designed Streaming Multiprocessor which delivers incredible performance and unmatched power efficiency, through an improved instruction scheduler and new data path organization.

Maxwell Memory Architecture
Improved caching effectiveness and significant enhancements in memory compression techniques in Maxwell reduces traffic and provides higher performance for applications dependent on memory bandwidth. Additionally, Maxwell's dedicated shared memory per SM (separated from the L1 cache) dramatically improves programmability and efficiency.

Viewport Multicast
Dedicated hardware to automatically broadcast input geometry to render to multiple render targets which drastically speeds up multi projection (the ability to render the same scene from multiple views) leading to accelerated rendering for cube maps used in multi-view projectors.

Sparse textures
Virtualizes texture sizes enabling applications to seamlessly work with large and complex data sets regardless of the available frame buffer.

Accelerated Voxelization
Enhancements to voxel handling techniques enables fast voxelization which significantly accelerates workflows like fluid simulation and 3D Printing.

Bindless Graphics
Optimizes GPU utilization by dramatically reducing CPU-GPU interactions, enabling developers to implement more sophisticated and complex algorithms providing end users greater performance and higher levels of visual fidelity.

H.264 and HEVC encoder
Dedicated H.264 and HEVC encode and decode engines that are independent of 3D/compute pipeline and delivers faster than real-time performance for transcoding, video editing, and other encoding applications.

NVIDIA CUDA Architecture
Parallel-computing architecture that tightly integrates advanced visualization and compute features to significantly accelerate professional workflows.

NVIDIA Scalable Geometry Engine Dramatically improves geometry performance across a broad range of CAD, DCC and medical applications, enabling you to work interactively with models and scenes that are an order of magnitude more complex than ever before.

Dynamic Parallelism
Simplifies GPU programming by allowing programmers to easily accelerate all parallel nested loops – resulting in a GPU dynamically spawning new threads on its own without going back to the CPU.

Large Framebuffer with Ultra-Fast Bandwidth
4GB GPU memory with fast bandwidth for display of large models and scenes, as well as computation of large datasets.

PCI Express 3.0 Compliance
Supports data transfer rate up to 8/GB sec per lane for an aggregate bandwidth of 32 GB/sec bi-directional (16 GB/sec in each direction.)

Unified Driver Architecture (UDA)
Guarantees forward and backward compatibility with software drivers, simplifying upgrading to a new Quadro solution whenever you're ready.

Remote Workstation Application Acceleration
Remotely interact with professional GPU-accelerated applications through software such as Microsoft RDP and Splashtop.

Ultra-Quiet Design
Silent cooling design enables lower acoustics for an ultra-quiet desktop environment.

NVIDIA GPU Boost
Automatically maximizes application performance in real time while staying within the power and thermal envelope of the card.

IMAGE QUALITY

Multi-pixel Programmable Sampling
Maxwell features multi-pixel programmable sampling, increasing sample flexibility and improved sample randomization which reduces quantization artifacts. This results in superior image quality without penalizing performance.

Full-Scene Antialiasing (FSAA)
Up to 64X FSAA for dramatically reducing visual aliasing artifacts or "jaggies," resulting in unparalled

image quality and highly realistic scenes.

NVIDIA® FXAA and TXAA Reduces visible aliasing and delivers higher image quality without the performance hit by harnessing the power of the GPU's CUDA cores and new film-style AA techniques.

16K Texture and Render Processing
Provides the ability to texture from and render to 16K x 16K surfaces. Beneficial for applications that demand the highest resolution and quality image processing.

DISPLAY FEATURES

NVIDIA Quadro Mosaic Technology
Enables transparent scaling of the desktop and applications across up to 16 displays from 4 GPUs from a single workstation while delivering full performance and image quality.

Multi-Display Support
All-new display engine drives up to four displays simultaneously and fully supports the next generation Display Port 1.2 standard capable of resolutions such as 3840 x 2160 at 60Hz, making it easy to deploy multiple displays across a desktop, build an expansive digital signage wall, or create a sophisticated stereoscopic 3D CAVE environment.

NVIDIA NVIEW Advanced Desktop Software
This software delivers maximum flexibility for single large display or multi-display options, providing unprecedented end-user control of the desktop experience for increased productivity.

DisplayPort 1.2 Support (with Audio)
Compact and secure DisplayPort 1.2 connectors support multi-stream technology, stream cloning and ultra-high-resolution panels (up to 3840 x 2160 at 60Hz). This enables maximum range, resolution, refresh rate, and color depth designed to support the latest display technologies.

NVIDIA 3D Vision and 3D Vision Pro
Advanced active shutter glasses that deliver crystal-clear stereoscopic 3D visualization for the most immersive experience. Infrared (3D Vision) or RF (3D Vision Pro) technology enable a range of immersive environments from your desktop workstation to collaborative work spaces. 3D Vision and 3D Vision Pro are sold separately.

OpenGL Quad Buffered Stereo Support
Provides a smooth and immersive 3D Stereo experience for professional applications.

Deep Color Processing and Display
Preserve color detail and precision throughout the processing and display pipeline for smooth gradients transitions, even on high dynamic range imagery. Each color component can be processed at up to 32-bit floating point precision and displayed at up to 12-bit precision with supported DisplayPort 1.2 or HDMI 1.4 displays.

SOFTWARE SUPPORT

NVIDIA CUDA Parallel Computing Architecture
Quadro solutions leverage general-purpose GPU computing using standard programming languages like C/C++ and Fortran, and emerging APIs such as OpenCL and Direct Compute. This broad adoption of

CUDA accelerates techniques like ray tracing, video and image processing, and computation fluid dynamics.

NVIDIA Enterprise-Management Tools
Exhaustive tools for maximizing your system uptime by enabling seamless wide-scale deployment. This allows remote query and control of graphics and display settings for systems spread across installations.

MULTI-GPU TECHNOLOGY

NVIDIA Multi-GPU Technology
NVIDIA Multi-GPU powered workstations combine the visualization and interactive design capability of multiple GPUs, by leveraging any combination of Quadro and Tesla GPUs to intelligently scale the performance of your application and dramatically speed up your production workflow.

Warranty & Support Tab

3-year warranty