NVIDIA QUADRO® FX 4000 SDI

The Integrated Graphics-to-Video Solution for Broadcast, Video, and Film Professionals

NVIDIA Quadro® FX 4000 SDI is the ideal solution for on-air broadcast professionals across many applications such as virtual-sets, sports, and weather news systems to composite live video footage onto virtual backgrounds and send the result to live video for TV broadcast.

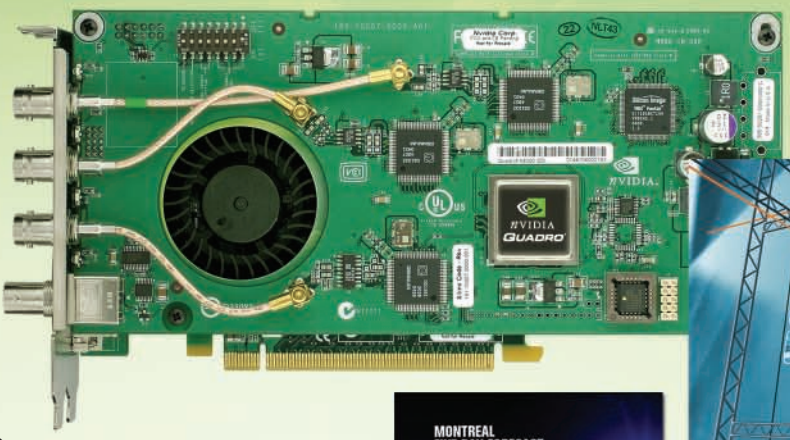

Image courtesy VizRT

Additionally, the solution allows film and video production, post-production, and finishing professionals to preview, in real time on HD broadcast monitors, the result of 3D compositing, editing, and color grading. This graphics-to-video-out solution delivers uncompressed 10-bit SDI from programmable graphics, enabling a direct connection to broadcast monitors, tape decks, or SDI projectors.

The NVIDIA Quadro FX 4000 SDI provides two channels, fill or key, of 8- or 10-bit uncompressed SDI in HD or SD formats, and analog and digital house synchronization. It supports both Windows and Linux and works on top of existing applications, or can be easily integrated within a broadcast or video editing application through NVIDIA's API.

The NVIDIA Quadro FX 4000 SDI leverages the new Quadro FX 4000 architecture with 2x the geometry and fill rate, 5x the hardware pixel read-back performance and 1.25x the memory bandwidth of previous generation workstation graphics.

Image courtesy Brainstorm/VertigoXMedia

It also supports ultra-fast GDDR3 memory and rotated grid full scene antialiasing (RG FSAA) for increased color accuracy and visual quality of edges and lines without compromising performance.

NVIDIA Quadro FX provides the ultimate in quality, precision, performance, and programmability. CAD and DCC applications acquire a new level of interactivity by enabling unprecedented capabilities in programmability and precision. For the first time, styling and production rendering become integral functions of the design workflow, shortening the production process and enabling faster time to market.

PRODUCT SPECIFICATIONS

Graphics Bus	AGP 8x (2.1GB/sec.) | PCI Express 16x
Form Factor	ATX, 4.25" x 8.5", Dual
Framebuffer Memory	256MB GDDR3
Memory Bandwidth	32GB/sec.
Max Power Consumption	105W | 81W
Display Connectors	DVI-I
SDI Support	2 Channels
Dual Link Support	Yes (1)
Genlock/Framelock Support	One Analog Genlock, One Digital Genlock
Auxiliary Power Connectors	Yes (2)
Number of Slots	2
Thermal Solution	Active Fansink

NVIDIA QUADRO FX 4000 SDI

FEATURES	BENEFITS
Uncompressed 8- or 10-bit SDI Output	The programmable GPU architecture and the NVIDIA Quadro FX 4000 SDI specific graphic user interface enable configurability of the video channels, color space conversion, and gamma correction. A video backend unit provides full support for outputs in the following HD and SD formats through 2 video channels with support for either 2 distinct channels of fill or 1 channel of fill and 1 channel of key (Alpha or Z): • 720p 23.98 Hz (SMPTE 296) • 720p 24.00 Hz (SMPTE 296) • 720p 25.00 Hz (SMPTE 296) • 720p 29.97 Hz (SMPTE 296) • 720p 30.00 Hz (SMPTE 296) • 720p 50.00 Hz (SMPTE296) • 720p 59.94 Hz (SMPTE296) • 720p 60.00 Hz (SMPTE296) • 1035i 59.94 Hz (SMPTE260) • 1035i 60.00 Hz (SMPTE260) • 1080i 47.96 Hz (SMPTE 274) • 1080i 48.00 Hz (SMPTE 274 • 1080i 50.00 Hz (SMPTE295) • 1080i 50.00 Hz (SMPTE274) • 1080i 59.94 Hz (SMPTE274) • 1080i 60.00 Hz (SMPTE274) • 1080PsF 23.976 Hz (SMPTE274) • 1080PsF 24.00 Hz (SMPTE274) • 1080PsF 25.00 Hz (SMPTE274) • 1080PsF 29.97 Hz (SMPTE274) • 1080PsF 30.00 Hz (SMPTE 274) • 1080p 23.976 Hz (SMPTE274) • 1080p 24.00 Hz (SMPTE274) • 1080p 25.00 Hz (SMPTE274) • 1080p 29.97 Hz (SMPTE 274) • 1080p 30.00 Hz (SMPTE274) • 480i 29.94 Hz (SMPTE259) NTSC • 576i 50.00 Hz (SMPTE259) PAL
Genlock (House Synchronization)	One digital and one analog genlock (BNC) connectors provide connectivity to a video sync source for SMPTE standard (digital, black burst, tri-level) synchronization.
Unparalleled Sub-pixel Precision	12-bit sub-pixel precision delivers high geometric accuracy, eliminating sparkles, cracks, and other rasterization anomalies.
Unmatched Color Precision	Full 128-bit precision graphics pipeline enables sophisticated mathematical computations to maintain high accuracy, resulting in unmatched visual quality. Full IEEE 32-bit floating-point precision per color component (RGBA) delivers millions of color variations with the broadest dynamic range.
Next-generation Vertex and Pixel Programmability	NVIDIA Quadro FX 4000 GPUs introduce infinite length vertex programs and dynamic flow control, removing the previous limits on complexity and structure of shader programs. With full support for Vertex and Shader Model 3.0, NVIDIA Quadro FX 4000 GPUs deliver sophisticated effects never before imagined for real-time graphics systems.
Rotated Grid FSAA (RG FSAA)	RG FSAA sampling algorithm introduces far greater sophistication in the sampling pattern, significantly increasing color accuracy and visual quality for edges and lines, reducing “jaggies” while maintaining performance

PRODUCT SPECIFICATIONS

Supported Operating Systems
- Microsoft Windows® XP
- Microsoft Windows 2000
- Linux® - Full OpenGL® implementation, complete with NVIDIA and ARB extensions

NVIDIA Quadro FX 4000 Architecture
- 128-bit IEEE floating-point precision graphics pipeline
- 128-bit color precision
- 12-bit sub-pixel precision
- 12x FSAA
- 65,536 fragment instruction
- 65,536 vertex instruction
- 3D volumetric textures
- 12 pixels per clock rendering engine
- Hardware accelerated antialiased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- Hardware accelerated clipping planes
- 3rd-generation occlusion culling
- 16 textures per pixel in fragment programs
- Window ID clipping functionality
- Hardware accelerated line stippling

Shading Architecture
- Fully programmable GPU (OpenGL 2.0/DirectX 9.0 class)
- Long fragment and vertex programs (up to 65,536 instructions)
- Looping and subroutines (up to 256 loops per vertex program)
- Dynamic flow control
- Conditional execution

Memory
- High-speed 256MB GDDR3
- 256-bit memory interface
- 32GB/sec. memory bandwidth

High Level Shader Languages
- Optimized compiler for Cg and Microsoft® HLSL
- OpenGL 2.0 and DirectX 9.0 support
- Open source compiler

High-Resolution Antialiasing
- 12-bit sub-pixel sampling precision enhances AA quality
- Rotated grid full-scene antialiasing (RG FSAA)

Maximum Resolution
- Dual Link DVI-I output-drives a digital display at resolutions up to 1920x1200 @ 60Hz
- Maximum digital resolution of 3840x2400 (@24Hz) through the dual-link connector
- Internal 400 MHz DAC drives one analog display up to 2048x1536 @ 75Hz each

nView Architecture
- Advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows

SDI Software Integration
- Transparent Mode works on top of existing applications
  - 1 channel fill
  - 8-bit:
    - RGB 4:4:4
    - YCrCb 4:2:2 or 4:4:4
- Extended Mode
  - Integrated into applications using NVIDIA’s SDI API
  - 2 channel fill or
  - 1 channel fill + 1 channel key
  - 8- or 10-bit:
    - RGB 4:4:4
    - YCrCb 4:2:2 or 4:4:4
    - 2x YCrCb 4:2:2+4:2:2
    - YCrCbA 4:2:2:4
    - RGBA 4:4:4:4 (8-bit only)

Where to buy NVIDIA Quadro

NVIDIA Quadro FX 4000 SDI is available through all major US OEMs and PNY Technologies (US and Europe), Leadtek (Asia-Pac), and ELSA Japan Please visit **www.nvidia.com/page/workstation.html** for information.

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