



Technical Brief

NVIDIA nForce3 MCPs
Advanced Storage Technology



Advanced Storage Solutions for Today's Computing Environments

The desktop experience is increasingly dependent on overall system performance, high-speed networking, rich streaming media, and a variety of multimedia capabilities. The speed and system capacities of CPUs and graphics processing units (GPUs) are advancing at an aggressive pace. However, basic system architecture is evolving slowly, and various critical devices and subsystems often degrade the overall experience. The NVIDIA nForce™ media and communication processors (MCPs) were introduced to meet these challenges, and the newest nForce3-based offerings extend the tradition of delivering advanced core technologies and industry-leading performance to the AMD Opteron™ and AMD Athlon™ 64 processors.

Benefits of NVIDIA nForce3 Storage Solution

The NVIDIA nForce3 MCPs apply NVIDIA data handling and system throughput expertise to advance the storage technology for professional platforms. The NVIDIA nForce3 solutions offer these benefits:

- Value
Built-in hardware and software solutions lower the overall computing costs and optimize critical storage capabilities. This lets system designers deliver exceptional value to users.
- Exceptional Performance
Storage devices can easily become a system bottleneck for applications that handle large and complex data. Streamlining the flow of data throughout the system and building in advanced disk striping techniques using NVIDIA RAID 0 ensures balanced, high throughput from current and future storage devices.
- Fault Tolerance
The innovative NVIDIA RAID solution brings affordable fault-tolerant capabilities to every desktop using RAID 0 and RAID 0+1.
- User Friendliness
Storage management is transparent to the application, which means users don't need to be technology experts. Preconfigured for optimal performance on the desktop, the NVIDIA nForce3 solutions deliver flexibility and simplicity for supporting a broad range of devices, including RAID storage technology.

Unmatched Performance

Storage devices are pushing the limits of today's popular system storage technologies. The emerging serial devices—those supported by the latest Serial ATA (SATA) interfaces—offer increased throughput. The NVIDIA nForce3 single-chip design provides high-performance solutions for the large assortment of existing ATA-133 devices, plus the new higher speed SATA devices. Since the NVIDIA nForce3 MCPs utilize up to an 8.0 GB/sec. connection to the CPU, they offer a well balanced architecture tuned for maximizing speed.

The NVIDIA nForce3 MCPs build in core technology to support advanced RAID 0 disk striping capabilities. Disk striping brings proven performance optimizations from the client/server world to the desktop, for an enhanced overall experience when large datasets require heavy disk access.

Serial ATA (SATA)

SATA is a next-generation storage technology offering greater disk bandwidth that overcomes the growing limitations of the older Ultra ATA technology. Along with bandwidth advantages, SATA offers easier cable routing using longer, thinner SATA cable designs that simplify system assembly.

The NVIDIA SATA solution:

- ❑ Supports up to four SATA-150 devices.
- ❑ Supports hot -swap capability allowing disks to be changed without powering down the system.
- ❑ Supports NVIDIA RAID technology.

Ultra ATA-133 Controllers

The NVIDIA nForce3 solutions deliver two or three independent built-in Ultra ATA-133 IDE controllers that support standard programmable input/output (PIO) and Direct Memory Access (DMA) operations. UltraDMA 33/66/100/133 standards are also supported for a maximum data transfer rate of 133MB/sec. per channel.

Separate independent datapaths for the IDE channels provide device configuration flexibility, with support for up to two devices per channel. Performance is further enhanced by many optimizations built into the NVIDIA IDE driver.

NVIDIA RAID Technology

Disk Striping

NVIDIA RAID technology implements industry-standard RAID 0 disk striping capabilities. Striping increases the throughput available from a disk drive by intelligently arranging data to minimize disk seeks during read and write operations.

NVIDIA nForce3 solutions enhance the standard RAID capabilities with a unique list of features and benefits:

- ❑ Support for RAID becomes independent of the operating system.
- ❑ RAID expertise is not required because the integrated solution is preconfigured and comes with an easy-to-use NVIDIA software interface.
- ❑ NVIDIA RAID supports system booting from a RAID device.

Fault Tolerance

NVIDIA RAID technology includes RAID 1 fault-tolerant capabilities. RAID 1 disk mirroring lets one disk serve as a hot standby for another disk, providing protection if a system or disk fails and ensuring high-availability access to mission-critical data. The NVIDIA RAID disk mirroring solution achieves fault tolerance, while delivering high-performance reads and writes.

Uniquely, NVIDIA RAID adds the ability to assign a dedicated spare disk to the RAID 1 or RAID 0+1 volumes. Should one of the volumes fail, the NVIDIA RAID solution will add the spare disk to the RAID disk array and automatically rebuild the array to include the new disk.

Like NVIDIA RAID 0 capabilities, the RAID 1 features require no special RAID expertise. NVIDIA RAID also allows for the RAID 0+1 operation, a combination of disk striping for optimized performance and disk mirroring for fault tolerance.

Conclusion

The advanced storage capabilities of the NVIDIA nForce3 MCPs continue the NVIDIA tradition of building in functionality that lets users get the most out of systems. High-demand functionality, adherence to popular and emerging standards, and ease of use distinguish the NVIDIA nForce solutions as delivering industry-leading value to today's PCs and workstations. And the NVIDIA proven record for optimizing the flow of data throughout the system now extends to the storage subsystem—a critical component for today's applications that handle increasingly large files, models, datasets, and digital environments.

NVIDIA nForce3 MCPs contribute vital technology that ensures optimized, balanced system performance for dynamic computing environments.



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NVIDIA.

NVIDIA Corporation
2701 San Tomas Expressway
Santa Clara, CA 95050
www.nvidia.com