



P4X^{DDR}333

Enabling Total System
Performance

VIA Apollo P4X266A

“VIA has had a lot more practical experience with DDR memory than Intel, and that experience shows.” - January 2002



“VIA's P4X266A seems to be the best platform for Intel's Pentium 4 right now.” - December 2001



“If you're in the market for a performance P4/PC-266 DDR solution, then the VIA P4X266A is currently the fastest solution.” - December 2001



VIA Apollo **P4X333**

Enabling Total System Performance



- **VIA Apollo P4X333**
 - World's Fastest Memory Controller
 - DDR333: 25% More Memory Bandwidth
 - 400/533MHz Processor Bus
 - AGP 8X
 - Double-Speed V-Link
 - USB 2.0
 - ATA-133
 - V-MAP Established Motherboard Base

P4X333: Raising The Bar

P4X333	P4X333 Advantage	Intel 845DDR
533MHz Processor Bus	+33%	400MHz Processor Bus
2.7GB/s Memory Bandwidth	+25%	2.1GB/s Memory Bandwidth
AGP 8X – 2.1GB/sec	+100%	AGP 4X 1.05 GB/s
V-link – 533MB/sec	+100%	Intel Hub Architecture 266MB/sec
USB 2.0 - 480 Mbps	+4000%	USB 1.1 - 12Mbps
ATA/133 – 133MB/s	+33%	ATA/100 - 100MB/s

VIA: Making DDR Happen

- **First mass produced Socket 423/478 DDR chipset**
 - VIA Apollo P4X266 brought DDR-SDRAM to the Pentium 4 platform for the first time
- **First mass produced Socket A DDR chipset**
 - VIA Apollo KT266 brought DDR-SDRAM chipset for AMD Athlon™ and Duron™ processors
 - VIA Apollo KT333 shipping in mass quantities now
- **First Mobile Chipset platform with DDR support for all mobile processor platforms**
 - VIA ProSavageDDR KN266 for AMD platform
 - VIA ProSavageDDR PN266T for Intel® Pentium® III-M & VIA C3™ processor platforms
 - VIA ProSavageDDR P4N266 for mobile Intel® Pentium® 4



DDR333: Immediate Transition

- Unavoidable Progression
 - Die Shrinks, Cost Reduction = Yield Improvement
- Design Win Activity
 - Motherboard makers predict 40-50% of designs will support DDR333 by end 2002
- DDR333 Performance Advantages
 - Bandwidth
 - 25% improvement in raw bandwidth
 - Latency
 - No loss in fundamental latency
 - CL2 at 266 = CL2.5 at 333

DDR333: Unstoppable Momentum

"Our customers tell us that speed counts. Samsung's fully validated DDR333 memory modules will ensure that VIA DDR333 chipset platform customers will have all the high-performance memory they need at competitive prices."



"Hynix's DDR333 memory modules, used in conjunction with VIA Apollo DDR chipsets, deliver outstanding performance and features. Hynix continues to pave the way for availability of low cost, high performance DDR features, utilizing validated PC2700 architecture and providing consumers with powerful technology that delivers exceptional system performance."



"Micron has been working with industry partners to enable DDR SDRAM and we are happy to report that DDR333 is well on its way to becoming the next DDR speed grade to be supported. After validating our DDR333 modules with VIA Apollo DDR333 chipsets, we will ramp production of DDR333 to coincide with industry demand."



VIA DDR333 Validation

- Industry Leading DDR Validation Program since November 2000
- Validation partners AVL and SMART Modular Technologies offer a fast, efficient service which ensures bullet-proof compatibility with VIA Chipset platforms
- Enabling a smooth transition to DDR333



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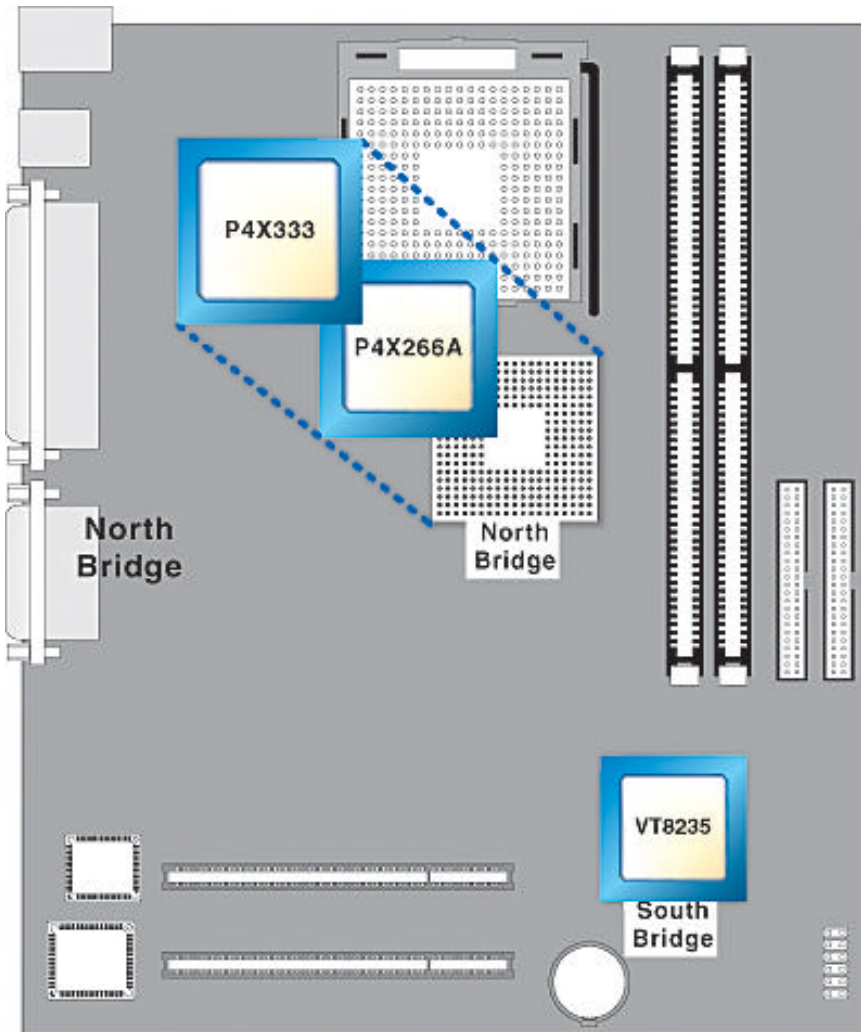
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V-MAP Compatible Chipset



- **V-MAP**
 - Drop-in North Bridge replacement for P4X266A
 - Future Pin-to-Pin Compatible North Bridge migration options
 - Future Pin-to-Pin compatible VT8235 Series South Bridge options with Serial ATA & 802.11b
- **Seamless product transitions on a single motherboard platform**
 - Faster Time to Market
 - Lower Product Development, Validation, and Production costs

AGP 8X – A New Dawn in Graphics Performance

The new AGP 3.0 specification is implemented in the P4X333

Features:

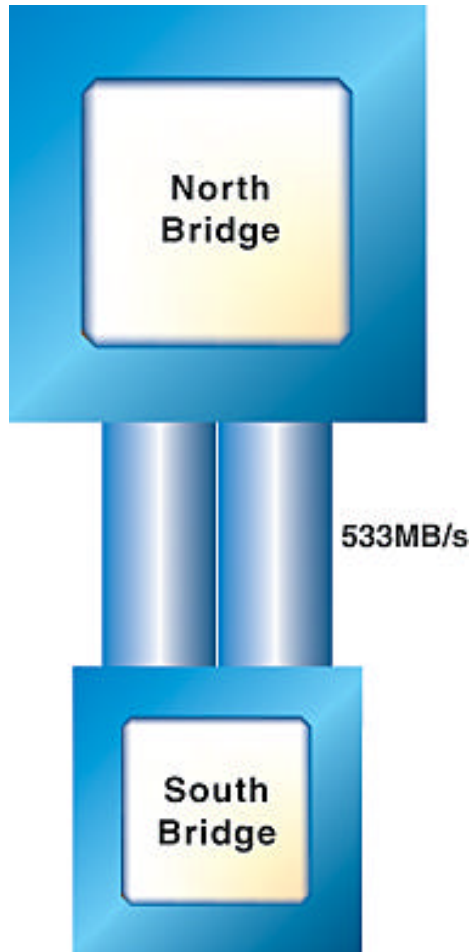
- Doubles frequency to 533MHz
- Maximum Data Transfer of 2.1GB/sec
- Pseudo-Synchronous with Processor Bus
- Backwards compatible with AGP 4X devices

Benefits

- Leverages fast system memory like DDR333 and more powerful processors like the Intel® Pentium® 4 and AMD Athlon™ XP
- Enables larger texture maps to be stored reducing the pressure on local frame buffer memory
- Provides headroom for future advances in graphics technology and offers more scope to hardware and software developers to push the boundaries of realism & quality.



Double-Speed V-Link – Eliminating the PCI bottleneck



Double-Speed V-Link transfers up to 533MB/s of data

2X - Intel Hub Architecture
4X - Conventional PCI bus

- Double transfer CLK rate to 133MHz
- Quad data pump per CLK, 266MB/S each direction
- Concurrent data up/down streams

Leveraging the speed and efficiency of USB 2.0 and ATA/133 integrated in the South Bridge to feed the powerful processor and memory system with the data they need for optimum performance.

USB 2.0 - 40X Faster

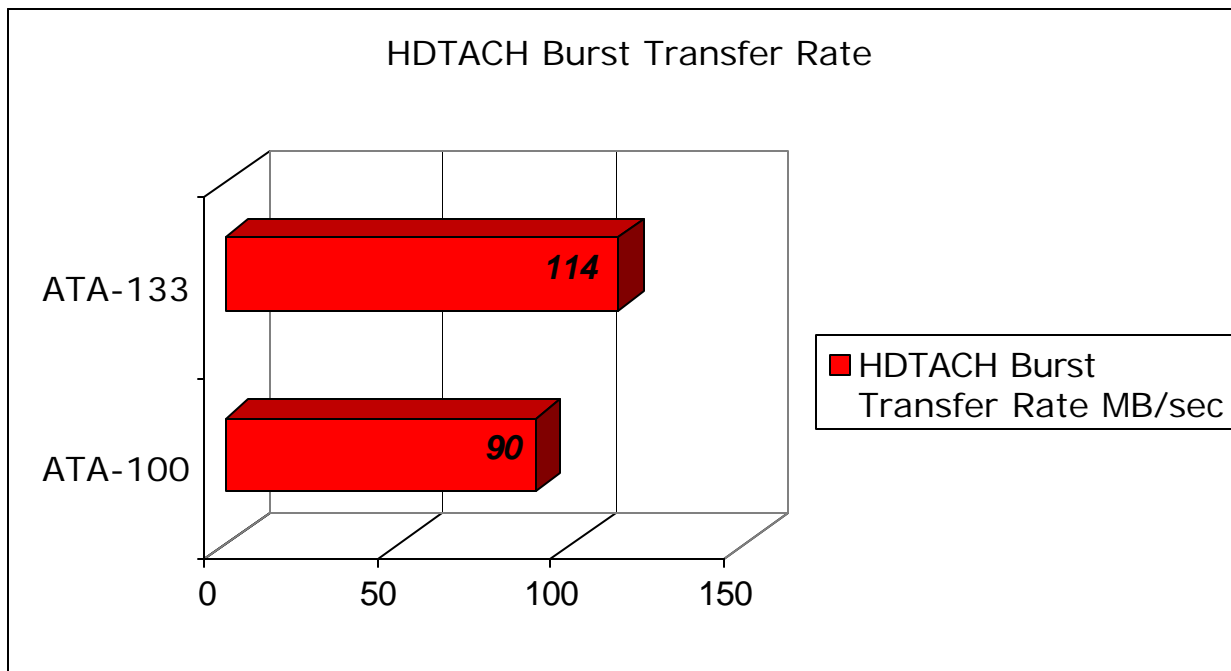


Following the widespread success of USB 1.1, VIA now sees the drive to new industry standard USB 2.0 as a natural evolution, meeting the greater bandwidth demands of today's PC peripherals and applications, from higher resolution video to fast storage unit access.

- **480 Mbps data capacity**
- **Backwards compatible with USB 1.1**
- **Ideal for today's bandwidth-hungry peripherals such as video cameras and next generation scanners and printers**
- **Enhances the performance of demanding applications such as interactive gaming and digital photography.**

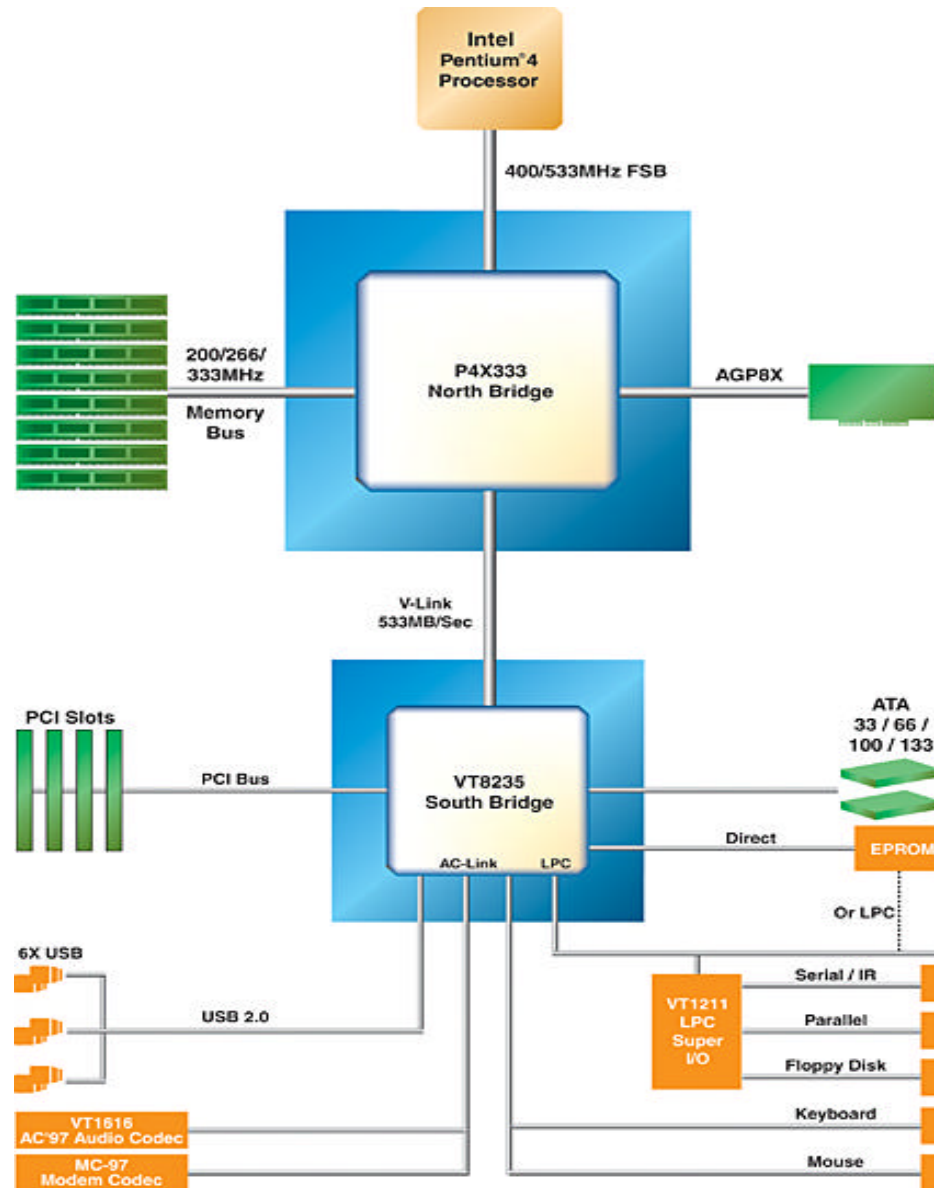
ATA-133: Bridging the Gap to Serial ATA

- ATA-133 offers 33% more bandwidth than the previous standard delivering more performance in a host of data intensive applications and especially in dual configurations like RAID
- The enhanced IDE controller supports all Ultra-DMA 33/66/100/133 devices including HDDs, CD-ROMS and DVD-ROMs
- Supports new generation BigDrive™ HDDs that break the existing 137GB limit on hard drive capacity and enable an exponential increase in data storage capacity for personal computing devices.



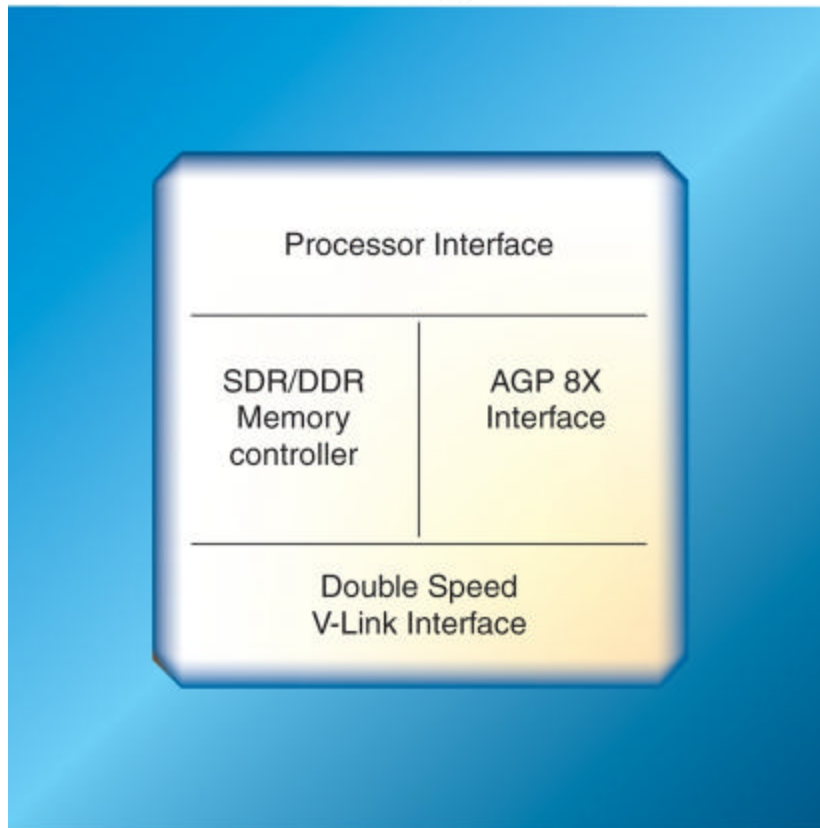
Source: Maxtor Corp
Test Setup: VIA Apollo
KT266A ref board with
VT8233A South Bridge,
Maxtor ATA100 &
ATA133 Drives, AMD
Duron™ 900MHz,
Windows® 98

Visual Specification



P4X333 North Bridge

P4X333 North Bridge Architecture



•Leading Edge Performance Features

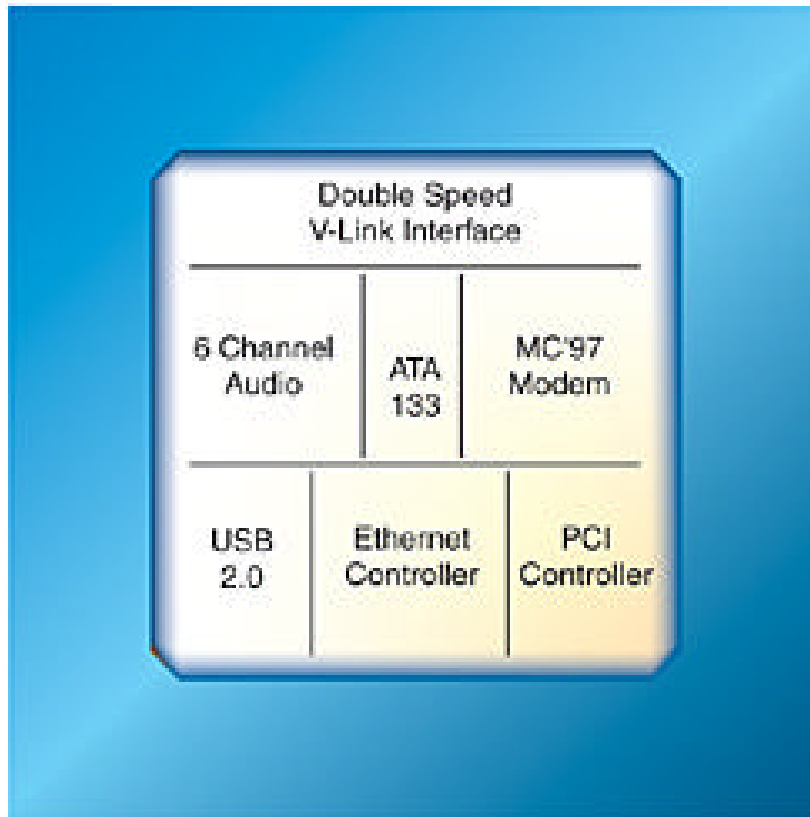
- 400/533MHz Front Side Bus
- Ultra-fast Memory Controller with 200/266/333MHz system bus
- Support for up to 32GB High-Speed DDR200/266/333 SDRAM
 - Peak data transfer rate of 2.7GB/sec
- Double-Speed V-Link Architecture
 - Peak bandwidth of 533MB/s
- AGP 8X dedicated graphics port with 2.1GB/s of bandwidth

•Unmatched Flexibility & Scalability

- Supports full range of Socket A 478-pin Intel® Pentium® 4 processors
- V-Map Architecture: Pin to Pin compatible with existing VIA Apollo P4X266A mainboard designs

VT8235 South Bridge

VT8235 South Bridge Architecture



•Leading Edge Performance Features

- USB 2.0 – 3 controllers for 6 ports
- ATA-133 Interface: Fastest IDE interface available. Two controllers for up to 4 separate Hard Disk Drives or other devices
- 6 Channel 5.1 compatible Surround Sound Audio
- Double-Speed V-Link Architecture
 - Peak bandwidth of 533MB/s

•Unmatched Flexibility & Scalability

- V-Map Architecture: Future Upgrades with Serial-ATA and 802.11b will be pin compatible

P4X333 Performance Highlights

- **P4X333 delivers stunning memory performance**
 - An average 29% performance gain over in SiSoft Sandra
- **Superior 3D Graphics & Gaming Performance**
 - 8% improvement in performance in Quake III
 - 7% better performance in 3DMark 2001
- **Powering Ahead in the Newest Benchmarks**
 - 7% improvement in performance in Jedi Knight 2
 - 38% better in Hi-Res CodeCreatures Benchmark

Test Setup

VIA P4X333 Reference Board vs VIA P4XB-RA Mainboard

HDD: IBM ATA-100 40GB HDD

Intel® Pentium® 4 2.0Ghz (Willamette)

MSI Nvidia Geforce 4 TI4600 128MB

Memory: Corsair XMS3000 max 2/2/2 DDR SDRAM

Drivers

VIA P4X333 Beta Drivers (available www.viarena.com)

Geforce Detonator 28.32

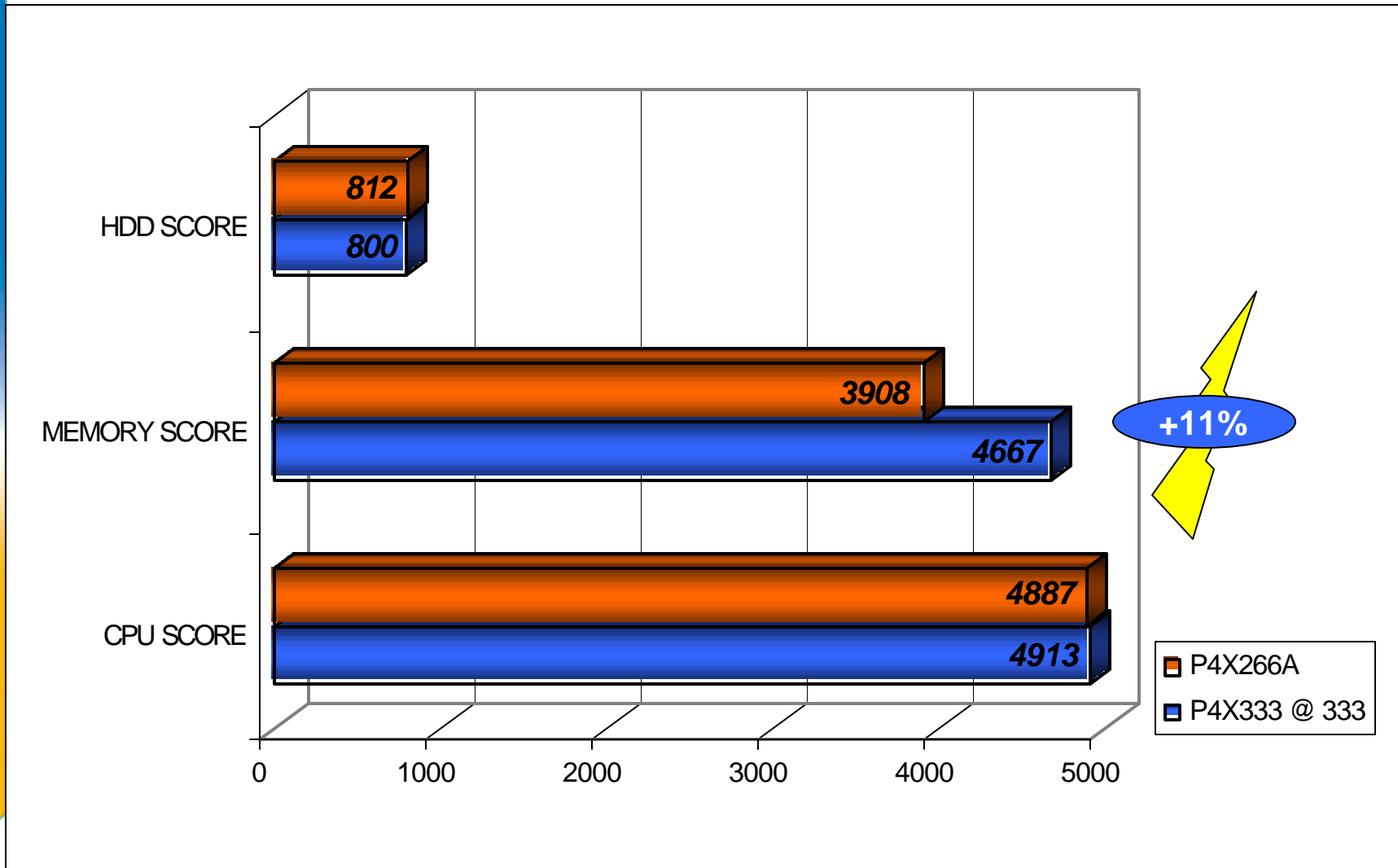
VIA 4 in 1 (P4XB-RA)



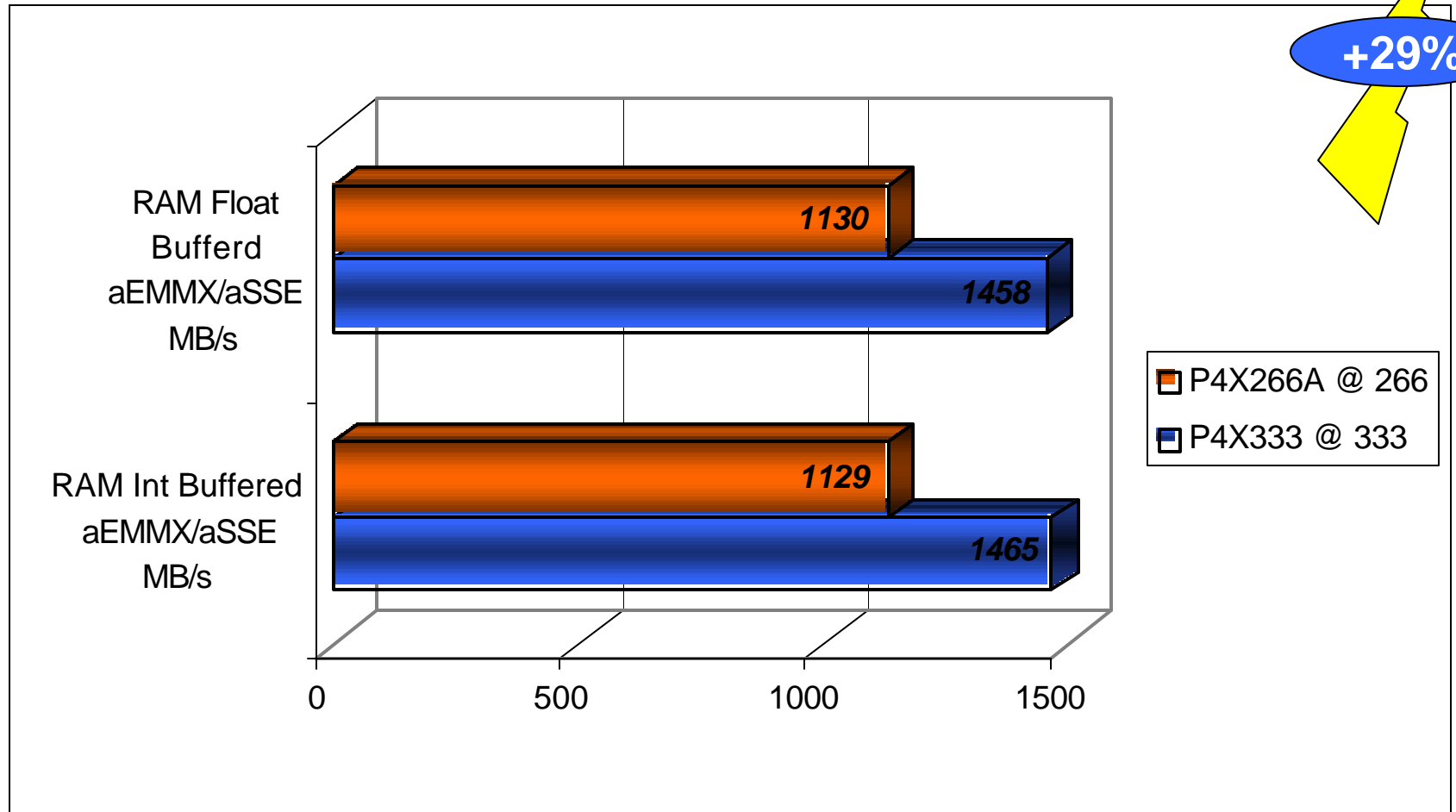
Benchmarks Tested

Synthetic Benchmarks	
Sisoft Sandra Memory Bandwidth	Reads & writes to the memory to measure the real efficiency of the memory subsystem in MB per second.
PC Mark 2002	Consists of a series of tests that represent common tasks in home and office programs.
Real World Benchmarks	
3D Mark 2001 SE	Objectively measures how effectively a PC runs 3D graphics applications (Supports DirectX 8.1).
Quake III	Graphics Engine tests efficiency of both CPU & memory subsystem giving complete picture of System efficiency.
Jedi Knight II	Very Latest game based on Quake III engine. More rigorous graphics technology built in stresses even the fastest current PC systems.
DroneZ	Useful benchmark for isolating effect of memory controller on system performance.
Creature Mark	The most advanced current Graphics Engine, beyond the capabilities of even the most powerful current systems.

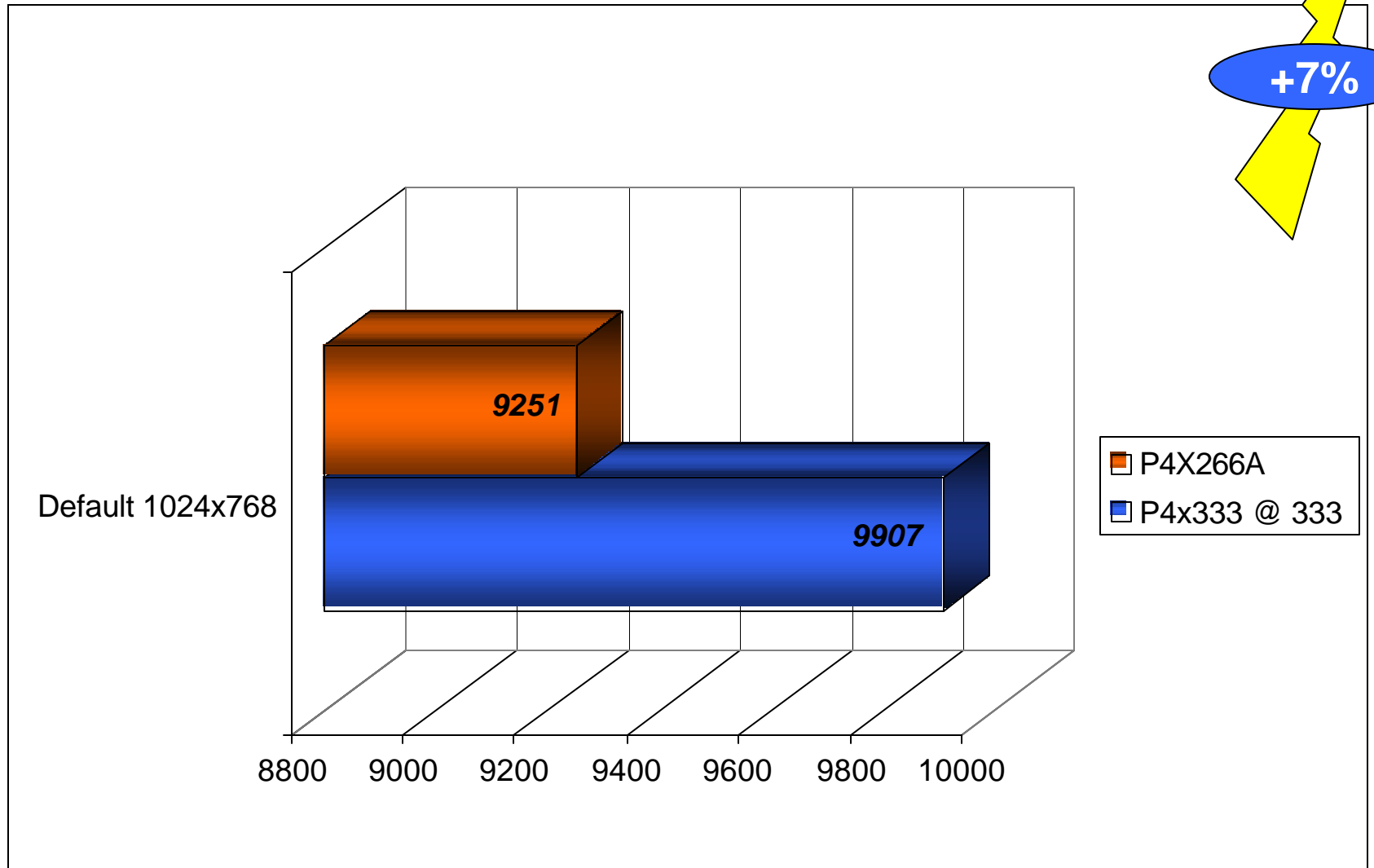
PC Mark 2002



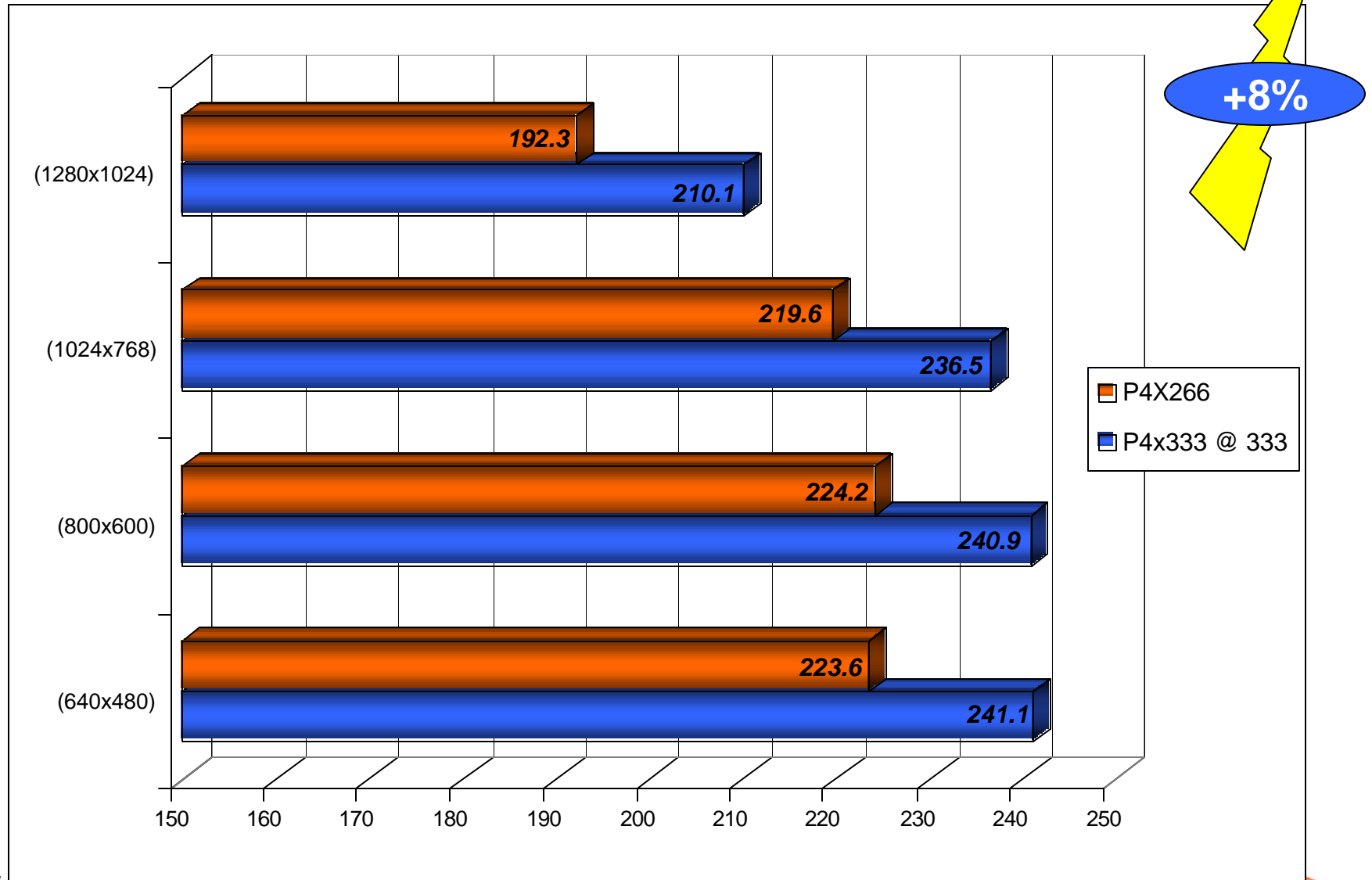
SiSoft Sandra Memory



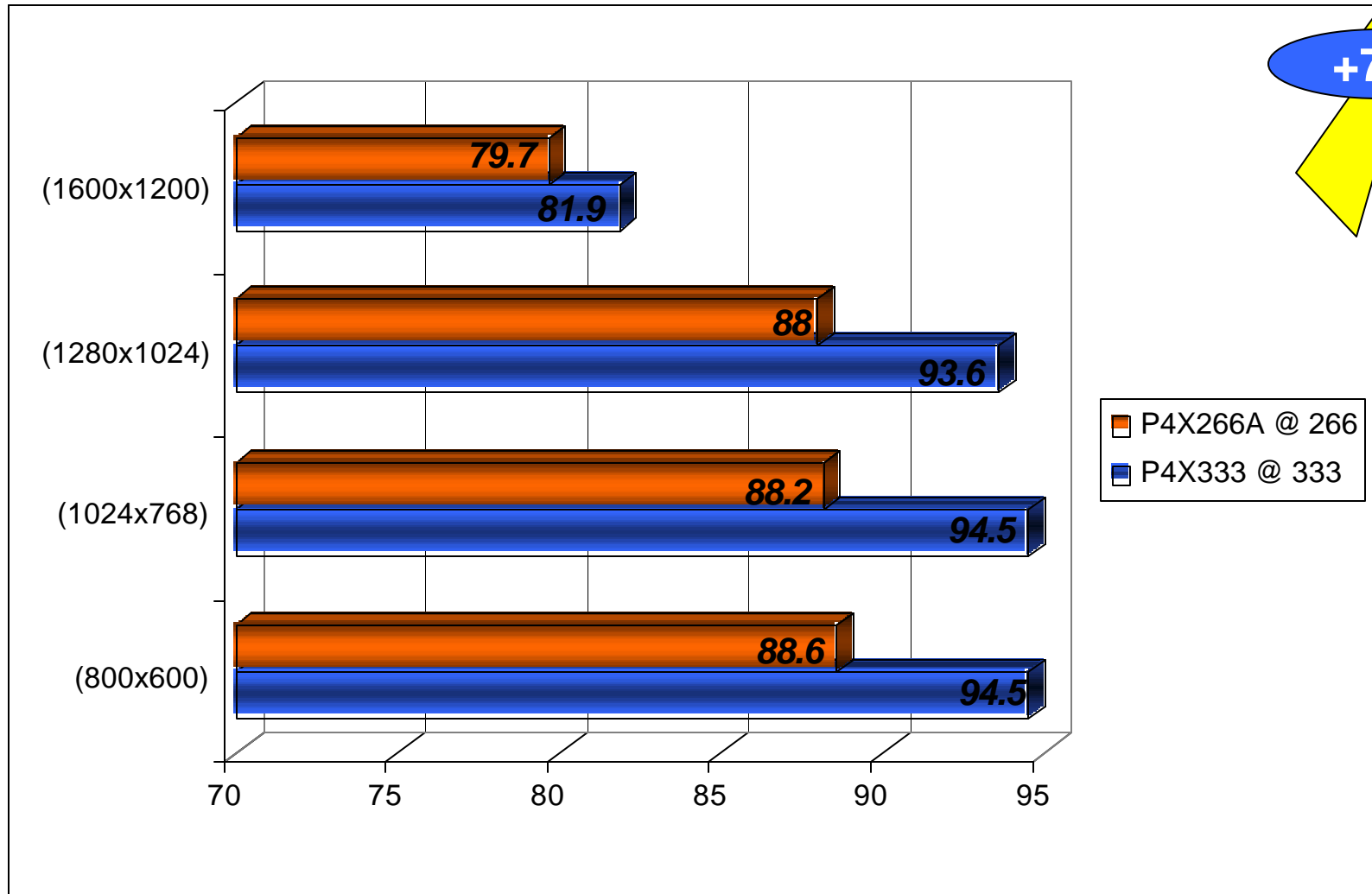
3D Mark 2001 SE



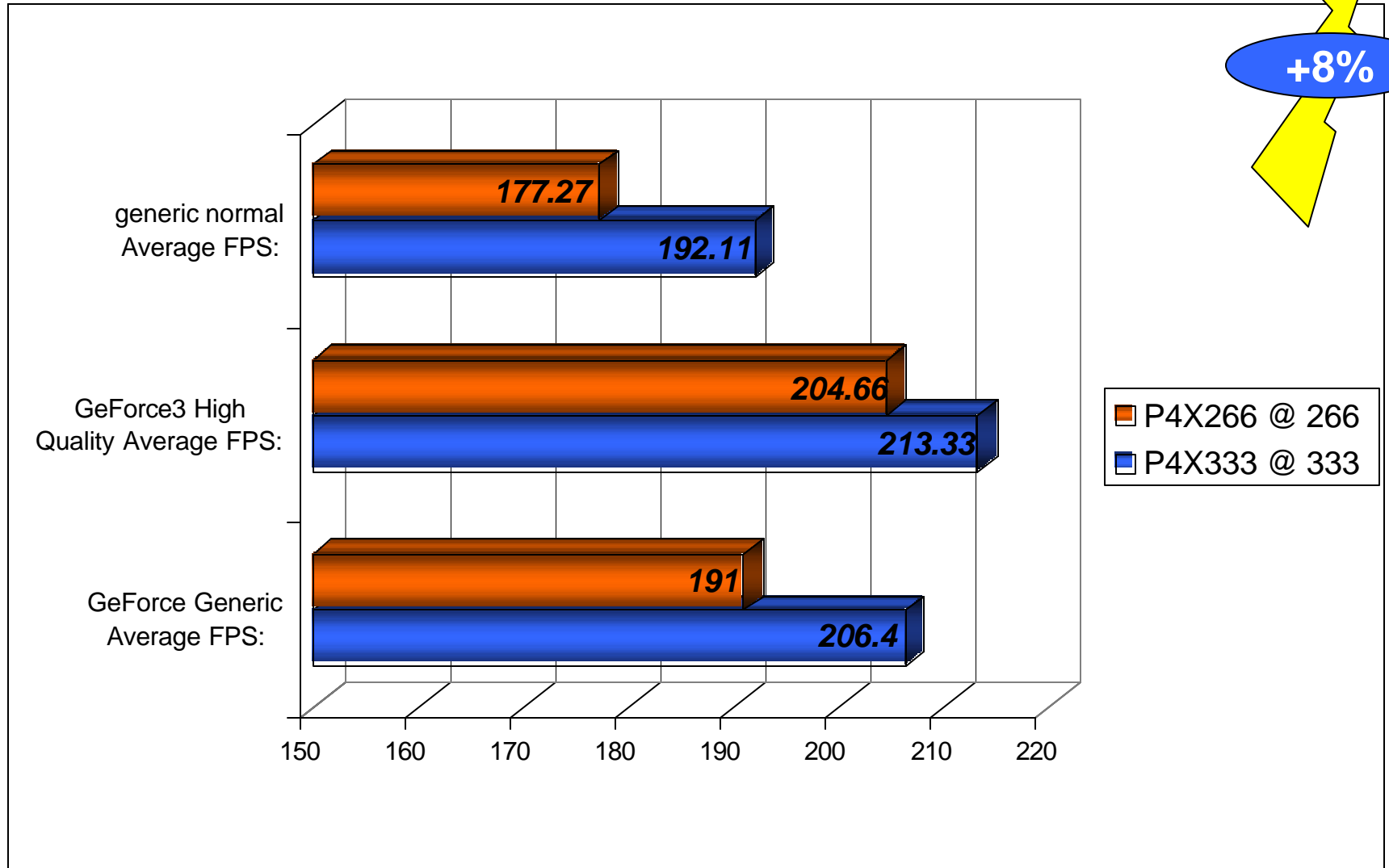
Quake III (High)



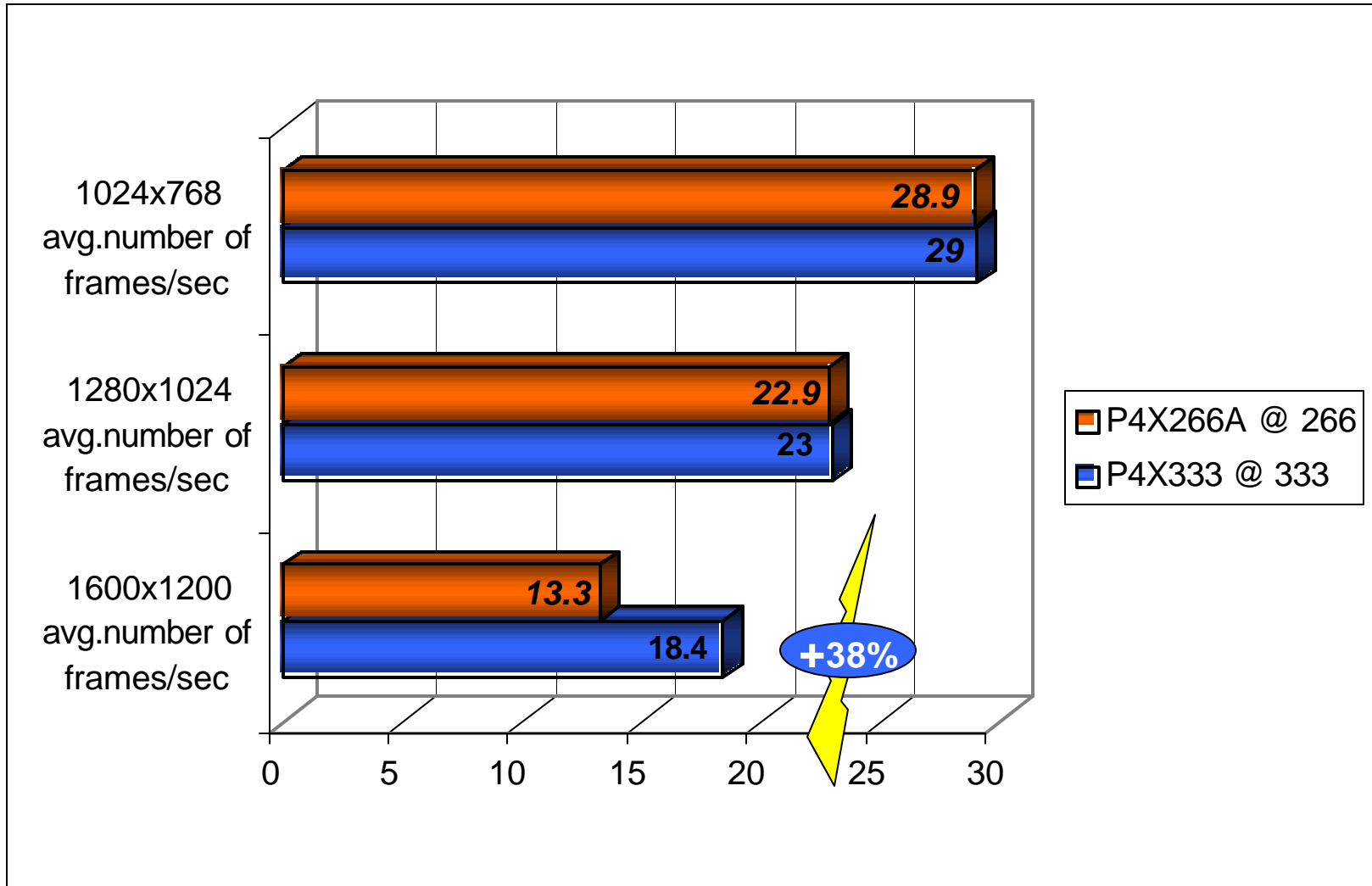
Jedi Knight 2



DroneZ



Creature Mark



P4X^{DDR}333

The Ultimate Intel® Pentium® 4 Platform

- **Ultimate Performance**
 - Total System Performance realised by DDR333 memory, 533MHz Processor Bus, AGP 8X, Double-Speed V-Link, USB 2.0 and ATA-133
 - VIA DDR333 Validation Program guarantees reliable and compatible supply of memory modules conforming the latest JEDEC specification
- **Ultimate Platform Stability**
 - V-MAP compatible, allowing simple transition from P4X266A and easy upgrades to future products.