



VIA ProSavageDDR KM266 Chipset

High Performance Integrated DDR platform for the
AMD Athlon™ XP

The VIA ProSavageDDR KM266: High Performance Integrated DDR platform for the AMD Athlon™ XP processor

With the launch of the VIA ProSavageDDR KM266 chipset, VIA Technologies, Inc is bringing even more choice to its range of Socket A chipsets enabling AMD Athlon™ XP and AMD Duron™ based systems to deliver exciting performance at very competitive price points. Harnessing the industry-leading performance of DDR (Double Data Rate) SDRAM, the flexibility of VIA Modular Architecture Platform (V-MAP) design, and the rich graphics performance of the enhanced S3 Graphics ProSavage8™ 2D/3D engine, the VIA ProSavageDDR KM266 reduces system cost while delivering unprecedented performance and stability.

The VIA ProSavageDDR KM266 also boasts the latest South Bridge technology with first to market innovations like integrated 3Com® networking in the VT8233C and the introduction of Ultra ATA-133 in the VT8233A. Ultra ATA-133, offering 33% more bandwidth between IDE device and CPU, enables the VIA ProSavageDDR KM266 to deliver more performance in data intensive applications including DVD playback and database software.

The launch of the VIA ProSavageDDR KM266 further extends the leadership role that VIA has played in enabling rapid industry wide transitions to higher bandwidth memory technologies and integrated graphics solutions that enable OEMs and SIs to address a fuller spectrum of PC price points. It achieves this through the implementation of the following key technologies:

- **DDR200/266 SDRAM Support:** The VIA ProSavageDDR KM266 offers up to 2.1GB/s of memory bandwidth with its support for up to 4GB DDR266 SDRAM. This provides memory intensive applications (such as content creation, media streaming, 3D gaming, etc.) the bandwidth they need to perform optimally.
- **S3 Graphics ProSavage8™ Integrated Graphics core:** The ProSavage8™ 2D/3D Accelerator with internal AGP 8X bandwidth and DVD Motion Compensation is optimized for use with the Microsoft Windows® XP operating system. Shared Memory Architecture (SMA) enables the ProSavageDDR KM266 to utilize the system memory for frame buffer and texture memory on data path doubled to 128-bit capacity. Thus, the DDR memory subsystem, offering up to 2.1GB/s of memory bandwidth, increases the overall performance of the integrated graphics core by up to 50% over SMA chipsets based on PC133 SDRAM.
- **V-MAP:** Based on the unique VIA Modular Architecture Platform (V-MAP), the VIA ProSavageDDR KM266 provides OEMs and SIs with unparalleled flexibility and scalability for existing and future PC designs. A choice of three South Bridge options with differing combinations of integrated communication and networking support enable a variety of different configurations and therefore price points.
- **High-Speed V-Link Hub Architecture:** The VIA ProSavageDDR KM266 makes use of VIA's V-Link Hub Architecture, which provides a dedicated



266MB/s bus between the north and south bridge. Less advanced chipsets use the 132MB/s PCI bus as a link, which must be shared with all PCI peripherals.

- **Optional External AGP Port:** Providing up to 1GB/s in graphics bandwidth with external AGP4X technology, this feature offers OEMs and System Integrators flexibility in building systems to different configurations and allows for future upgrades. Additionally, it does not sacrifice AGP 2X compatibility like less advanced chipsets, allowing competitively priced graphics products to be integrated into Value PC systems.

This white paper describes the features of the VIA ProSavageDDR KM266 chipset as well as the combination of performance and cost efficiency that enables next generation computing for mainstream and value desktops, workstations, and servers based on the AMD Athlon™ XP processor.

Integrated Graphics

The VIA ProSavageDDR KM266 with the S3 Graphics ProSavage8™ core integrated into the North Bridge enables AMD Athlon™ XP processor based systems to hit mainstream and value price points by offering a combination of performance and value unmatched by existing chipset platforms.

The VIA ProSavage range based on PC133 SDRAM has proved popular with OEMs and SIs for the following reasons:

Integration reduces system cost: Integrated graphics allow OEMs and System Integrators to eliminate an external graphics card from the cost of a VIA ProSavage based system while maintaining competitive 2D and 3D performance.

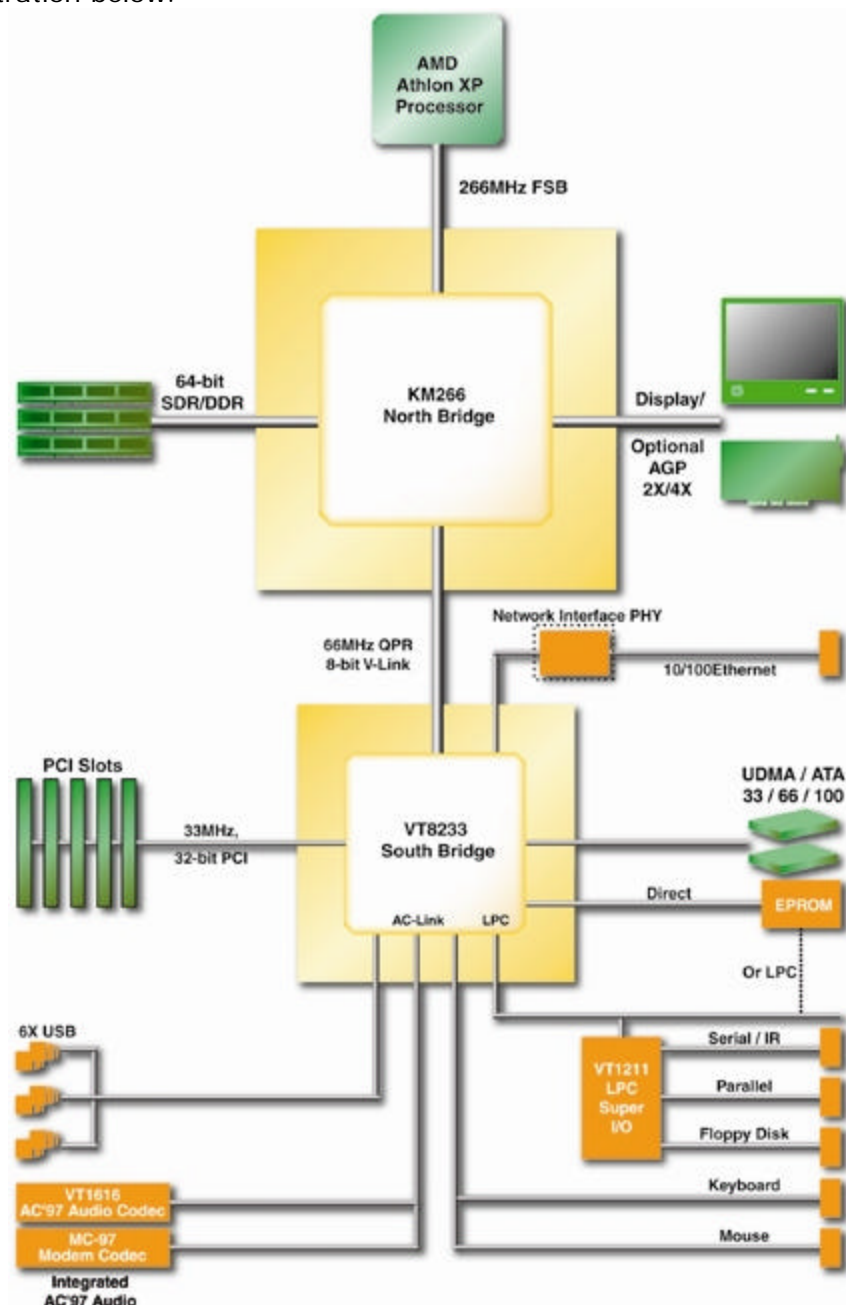
ProSavage Graphics Performance: With AGP 4X, 32MB of frame buffer and DVD motion compensation the ProSavage4™ provides rich 2D/3D graphics performance and has an unblemished record of reliability.

ProSavage Driver Set: S3 Graphics ProSavageDDR chipsets have a mature and comprehensive unified driver set, minimizing compatibility issues and reducing deployment risk for corporate customers.

The VIA ProSavageDDR KM266 retains these three key advantages of VIA ProSavage integrated chipsets while offering a significant increase in graphics performance through the benefits of DDR266 SDRAM memory in a Shared Memory Architecture Design. The new S3 Graphics ProSavage8™ integrated into the VIA ProSavageDDR KM266 shares the same architecture and feature set as the ProSavage4™ but boasts internal data paths expanded to 128-bit from 64-bit giving an effective AGP 8X bandwidth capacity and increasing 3D performance by up to 70% over PC133 SDRAM based SMA chipsets.

VIA ProSavageDDR KM266 Product Overview

The VIA ProSavageDDR KM266 consists of two separate chips: The 552-pin VT8375 Integrated North Bridge, and a choice of 376-pin VT8233 series V-Link South Bridges. Both use standard PGA packaging to reduce the cost of production and allow the use of standard heatsink solutions. The basic architecture of the chipset is shown in the illustration below.



VIA ProSavage KM266 North Bridge

The North Bridge of the VIA ProSavageDDR KM266 (model number VT8375) provides support for flexible 200/266MHz Front Side Bus for AMD Socket A compatible

processors. Deep pipelining and buffering keep the high-speed system bus supplied with a constant stream of data, maximizing the performance of the processor. This system bus runs in pseudo-synchronous operation with the memory and AGP controllers, providing the low latency of a synchronous design without sacrificing the flexibility of an asynchronous implementation.

The VT8375 integrates the ProSavage8™ graphics core into the North Bridge offering competitive 2D/3D performance while retaining an optional external AGP 4X port for configuration flexibility. The VT8375 also does not sacrifice support for older AGP2X models, providing OEMs and SIs with additional configuration options.

The VT8375 North Bridge of the VIA ProSavageDDR KM266 has a flexible memory controller that supports up to 4GB of DDR200/DDR266 SDRAM. Virtual Channel Memory and Error Correcting Code (ECC) memory are also supported, as is PC100 and PC133 SDRAM. With such flexible memory support, the VIA ProSavageDDR KM266 gives OEMs and SIs maximum scalability to allow the construction of a full spectrum of high-performance and low-cost systems from mainstream consumer and commercial desktops to high-end workstations.

VIA ProSavageDDR KM266 South Bridge

The VIA ProSavageDDR KM266 is capable of interfacing to any VIA V-Link South Bridge, including the VT8233, VT8233C and VT8233A, as well as future South Bridge designs. The VT8233 and VT8233C are highly integrated network-ready South Bridges that feature two high-speed ATA-100 IDE controllers (4 IDE devices total), six USB ports, 6 PCI slots, Low Pin Count (LPC) interface, and an I/O Advanced Programmable Interrupt Controller (APIC). Advanced Configuration and Power Interface (ACPI) and Advanced Power Management (APM) are also integrated into all VT8233 family products. The VT8233C adds an integrated 3Com® Ethernet MAC controller, providing high quality and ultra reliable 10/100 Mbps network support.

All VIA V-Link South Bridges feature high quality, 6 channel AC/97 2.2 sound support, as well as an MC/97 software modem interface. These features, along with 10/100 Ethernet and HomePNA support, can be harnessed through the use of an ACR (advanced communication riser) slot, or can be integrated directly onto the system board.

The enhanced IDE controllers on the VT8233 and VT8233C support all Ultra-DMA 33/66/100 devices including as CD-ROMS, DVD-ROMs, and hard disk drives. ATA-100 is the fastest IDE standard currently available on the market, and allows each separate IDE controller on the VT8233 and VT8233C to burst up to 100MB/s, for a total of 200MB/s of bandwidth. Each controller also supports up to two devices, for a total of four ATA-100 capable drives.

The three USB hubs offering a combined 36 Mbps of bandwidth on the VT8233 family provide additional flexibility by allowing the user to add up to six USB devices to the system, such as keyboards, mice, drives, digital cameras, scanners, speakers, modems, joysticks, and MP3 players.

VT8233A

The VT8233A is the first South Bridge Chip to support Ultra ATA-133, the new IDE interface that offers 33% more bandwidth for data transfer between storage devices and CPU. The enhanced IDE controller supports all Ultra-DMA 33/66/100/133 devices



including HDDs, CD-ROMS and DVD-ROMs as well as 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.

ATA-133 is the fastest IDE standard currently available on the market, and allows each separate IDE controller to burst up to 133MB/s, for a total of 266MB/s of bandwidth. This offers a significant performance improvement in data intensive professional applications like spreadsheets and in consumer applications including DVD playback. Each controller also supports up to two devices, for a total of four ATA-133 capable drives.

The VT8233A is a highly integrated South Bridge that features ultra-fast VIA V-Link North-South Bridge interface, four USB ports, 6 PCI slots, Low Pin Count (LPC) interface, and an I/O Advanced Programmable Interrupt Controller (APIC). Advanced Configuration and Power Interface (ACPI), Advanced Power Management (APM), high quality, 6 channel AC/97 2.2 sound support, as well as an MC/97 software modem interface are also integrated into the VT8233A.

VIA V-Link Architecture

VIA has developed V-Link technology to remove the PCI bus as the bottleneck in inter-chip communication. In less advanced chipsets, the PCI bus is responsible for connecting both the North and South Bridge, as well as providing a bus for most add-in peripherals. VIA V-Link technology provides a dedicated 66MHz quad-pumped bus between the North and South Bridge, freeing up the PCI bus to deal strictly with peripheral devices.

DDR SDRAM Overview

DDR SDRAM technology is the result of an industry-wide collaboration to develop the next generation memory standard. It is designed to provide a high performance, high value upgrade path from previous PC133 technology. As the driving force behind PC133, VIA Technologies has embraced DDR, and currently offers the widest range of DDR chipsets for the Intel® Pentium® III, AMD Athlon™ XP, and Intel® Pentium® 4 processor platforms.

Available in two different speed grades, DDR enables memory performance to be scaled to fit the performance and cost requirements of a given platform. DDR200 (also known as PC1600) runs at a 100MHz clock speed, and transfers data on both the rising and falling edges of the clock for an effective 200MHz clock rate. DDR266 (or PC2100) uses the same clock doubling technology, but runs at a 133MHz core speed, for an effective 266MHz clock rate.

With this clock doubling technology, DDR200 is able to transfer up to 1.6GB/s, and DDR266 a staggering 2.1GB/s. Also, due to its evolutionary, parallel technology, the latency of DDR is quite low compared to competing serial memory technologies.

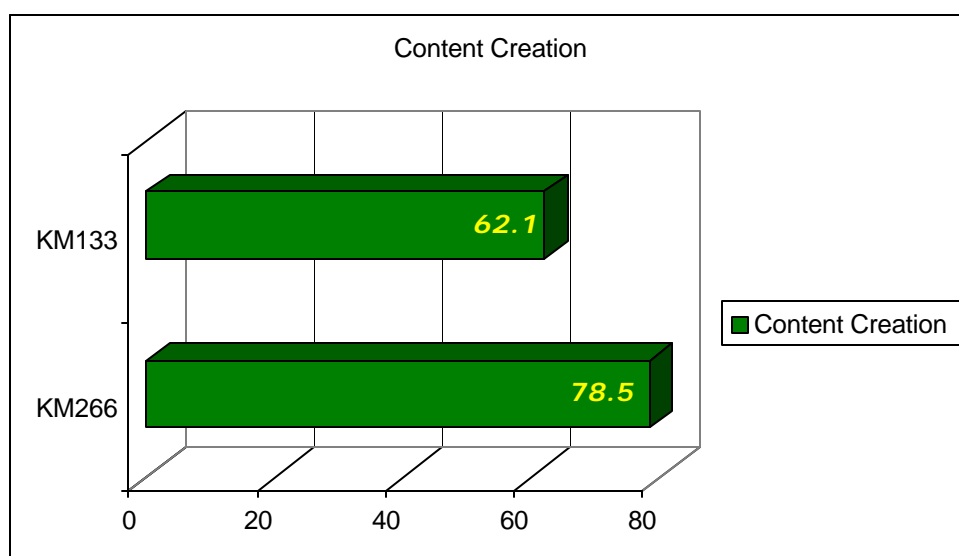
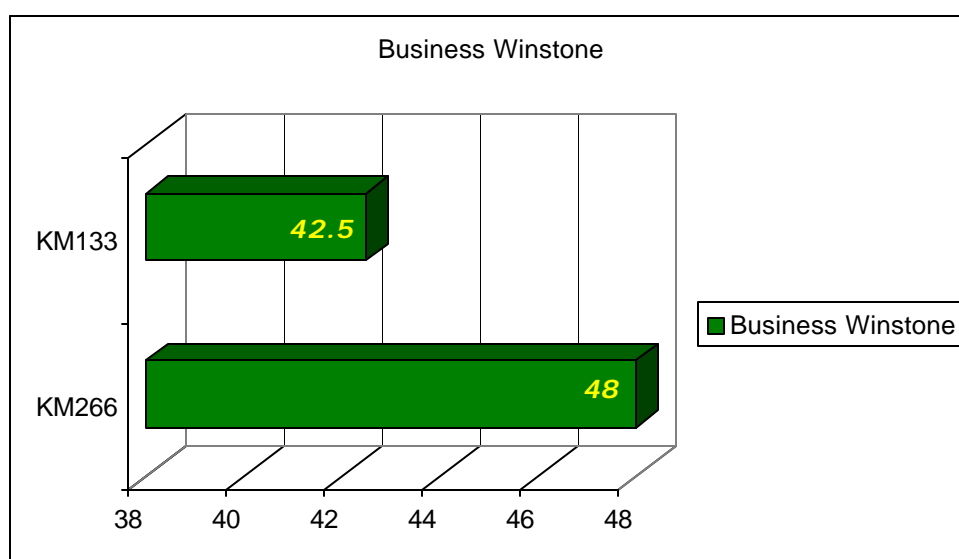
All grades of DDR SDRAM operate at 2.5 volts, as opposed to 3.3V for PC100 and PC133. This lowered voltage allows DDR to penetrate power sensitive applications, such as notebooks and 1U servers. Lowered power consumption translates directly to lowered heat dissipation, again increasing the effectiveness of DDR in mobile and server applications.



DDR SDRAM leverages the existing PC133 manufacturing infrastructure, allowing manufacturers to produce DDR266 memory for roughly the same cost as PC133. This price parity with SDRAM will rapidly drive the adoption of DDR as memory bandwidth limitations become more constricting.

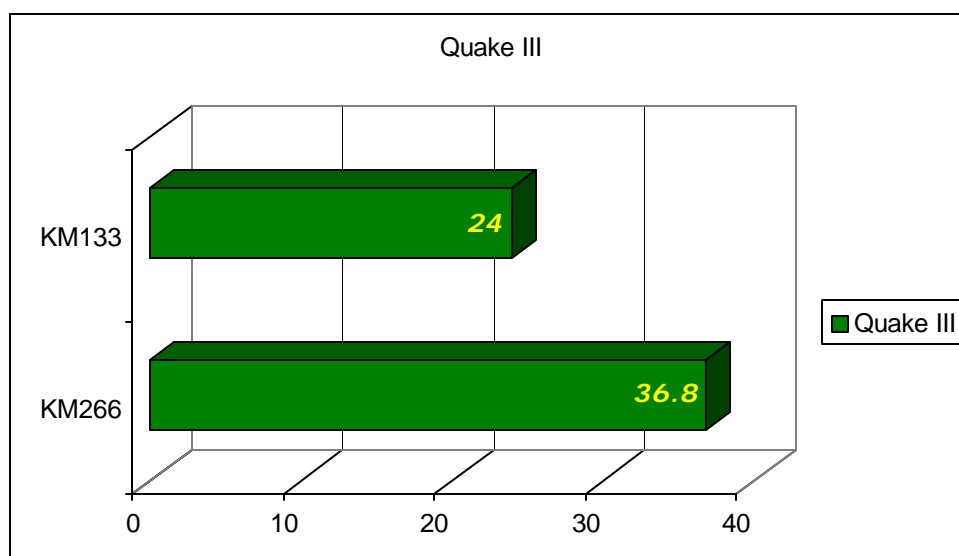
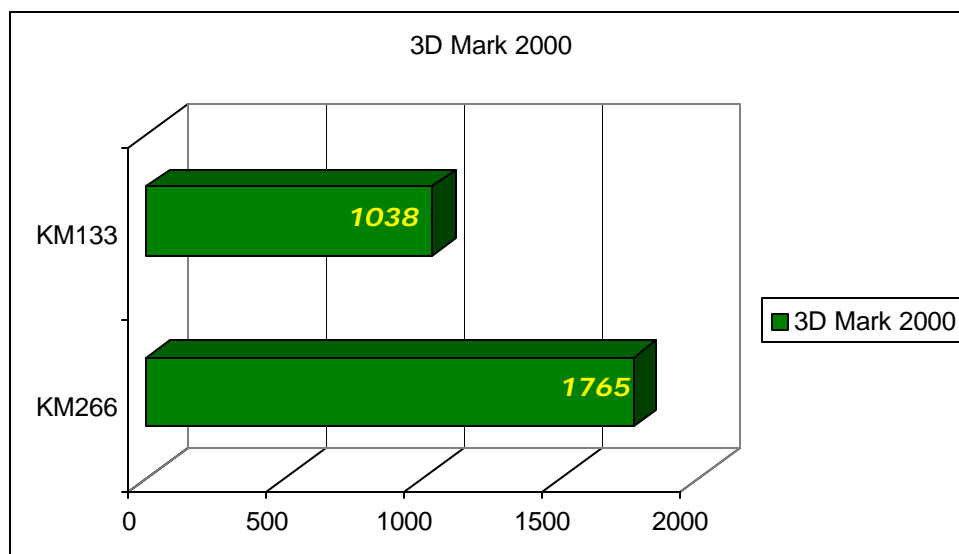
VIA ProSavageDDR KM266 Chipset Performance

Through its use of high-performance DDR266 memory, high-speed V-Link bus, deep buffering and pipelining, and optimised timings, the VIA ProSavageDDR KM266 offers superior performance across a range of industry standard applications. Offering a huge performance boost over the existing PC133 based desktop systems, the VIA ProSavageDDR KM266 provides the AMD Athlon™ XP processor platform with the bandwidth it needs for performance hungry functions like multi-tasking.



3D Mark 2000 and Quake III Arena, the industry standards when gauging the 3D performance of a platform reveal the VIA ProSavageDDR KM266 represents a major

step forward in mainstream integrated graphics performance. The high bandwidth and low latency of DDR266 memory increase the performance of the integrated ProSavage8™ graphics core over PC133 based integrated graphics chipsets giving the VIA ProSavageDDR KM266 a performance boost of up to 70% in 3D applications.



Conclusion

The VIA ProSavageDDR KM266 delivers unparalleled performance and features at an affordable price, and provides the headroom and security that corporate and institutional buyers require for a 3 year product lifecycle. As part of the industry's largest range of SMA and DDR SDRAM based chipsets the VIA ProSavageDDR KM266 represents proven technology, and a low risk, scalable platform for development of high performance AMD Athlon™ XP processor based systems.

Appendix

The reference systems were based on the following configurations:

Chipset	VIA ProSavageDDR KM266	VIA ProSavage KM133
Processor	AMD Athlon™ XP 2000	AMD Athlon™ XP 2000
Memory	256MB PC2100 (Micron)	256MB PC133 (Micron)
Graphics	S3 Graphics ProSavage8™	S3 Graphics ProSavage4™
HDD	IBM 40GB	IBM 40GB
Operating System	Windows® XP Pro	Windows® XP Pro

Trademarks

Intel®, the Intel® logo, Pentium®, and combinations thereof, are trademarks of Intel® Corporation.

Athlon™ and Duron™ are trademarks of Advanced Micro Devices. The acronym AMD is used to represent Advanced Micro Devices in this document.

Windows® is a trademark of Microsoft Corporation

Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies.