



Mobile Pentium® Processor with MMX™ Technology Performance Brief



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INTRODUCTION

The Intel mobile Pentium® processor family provides outstanding performance for all mobile applications. Manufactured from Intel's latest state-of-the-art process technology, the mobile Pentium processors with MMX™ technology on 0.25 micron (166, 200, 233, & 266 MHz) enable new levels of multimedia and communications performance and are the highest performing mobile Pentium processors. The mobile Pentium processor family now consists of the following products:

- Mobile Pentium® processor with MMX™ technology on 0.25 micron at 266 MHz
- Mobile Pentium processor with MMX technology on 0.25 micron at 233 MHz
- Mobile Pentium processor with MMX technology on 0.25 micron at 200 MHz
- Mobile Pentium processor with MMX technology on 0.25 micron at 166 MHz
- Mobile Pentium processor with MMX technology at 166 MHz
- Mobile Pentium processor with MMX technology at 150 MHz
- Mobile Pentium processor with MMX technology at 133 MHz
- Mobile Pentium processor with MMX technology (Low-Power) at 120 MHz
- Mobile Pentium processor at 150 MHz
- Mobile Pentium processor at 133 MHz
- Mobile Pentium processor at 120 MHz

Today's microprocessor performance can be best assessed using three different vectors: **Integer Benchmarks, Multimedia Benchmarks, and Floating-Point Benchmarks.** **Integer Benchmarks** simulate the activities of end users working in typical productivity applications such as word processing, spreadsheets, presentation applications, and personal finance programs. **Multimedia Benchmarks** are designed specifically to simulate the activities of end users utilizing video, digital sound, PC imaging, or Video Conferencing, and other similar media-rich applications. **Floating-Point Benchmarks** measure the performance of three dimensional visualization techniques such as games to support richer textures and enhanced lighting effects.

Representative integer benchmarks include: Processor Level Benchmarks- SPECint* 95, CPUmark*32, Norton*SI32. System Level Benchmarks- SYSmark*32 for Windows* 95, SYSmark*32 for Windows* NT 4.0, SYSmarkNT

Representative multimedia benchmarks include: Intel Media Benchmark, Norton* Multimedia Benchmark from Norton Utilities for Windows* 95, Intel MMX™ Technology Applications

Representative floating-point benchmarks include: 3D geometry portion of the Intel Media Benchmark, 3D graphics portion of the Norton Multimedia Benchmark, 3D WinMark* Suite of 3D WinBench* 97

This report provides test results on the three vectors of performance on Intel's mobile Pentium processors with MMX technology (133, 150, 166, 200, 233, & 266 MHz) performance normalized to the mobile Pentium processor with MMX technology at 133 MHz. We selected the following benchmarks to represent the three vectors of performance:

- 1) **Integer:** CPUmark*32
- 2) **Multimedia:** Norton* Multimedia
- 3) **Floating-Point:** 3D WinBench* 97

Details of the system configurations used in all the benchmarks throughout this brief are described in Appendix A.



The Intel Mobile Pentium® Processor with MMX™ Technology

The Intel Mobile Pentium processor with MMX technology extends the mobile Pentium processor family, providing additional performance for notebook applications. The mobile Pentium processor with MMX technology is compatible with the entire installed base of applications for MS-DOS*, Windows*, OS/2*, and UNIX* and is one of the major microprocessors to support Intel MMX technology. The mobile Pentium processor with MMX technology enables new levels of multimedia and communication performance. It has immediate responsiveness for the latest, most demanding software with powerful realistic graphics and the ability to run full-screen, full-motion video.

MOBILE PENTIUM® PROCESSOR WITH MMX™ TECHNOLOGY PRODUCT FEATURE HIGHLIGHTS

Such dramatic performance allows the mobile Pentium processor with MMX technology to run today's most demanding mobile applications. It has the performance to run full-screen, full-motion video, real-time animation, compute intensive 3D modeling graphic applications, and mobile multimedia presentations.

The mobile Pentium processor with MMX technology is fully compatible with an entire library of mobile applications based on operating systems such as MS-DOS*, Windows* 3.1, Windows* 95, OS/2*, UnixWare*, SCO UNIX*, Windows* NT, OPENSTEP*, and Sun Solaris*. It has several features which allow high-performance notebooks to be designed, including the following:

- 120 (Low-Power), 133, 150, 166, 200, 233, and 266 MHz
- New instructions that accelerate multimedia and communications performance
- 32 Kbyte Level One Cache
- Separate Code and Data Caches with MESI Protocol
- Pin Compatible with previous Pentium processors
- Improved Branch Prediction
- Superscalar Architecture
- More efficient instruction decoder
- Floating-Point Unit
- 64-bit External Data Bus
- Performance Monitoring and Execution Tracing
- High-Reliability Error Detection
- 2.45V core and 3.3V I/O buffer supply for 133/150/166 MHz processors
- 2.22V core and 3.3V I/O buffer supply for 120 MHz (Low-Power) processor
- 1.8V core and 2.5V I/O buffer supply for 166/200/233 MHz processors on 0.25 micron
- 2.0V core and 2.5V I/O buffer supply for 266 MHz processor on 0.25 micron



MICROPROCESSOR PERFORMANCE SUMMARY

WINDOWS* 95 PROCESSOR BENCHMARK

The 32-bit integer Windows performance of the Pentium processor is illustrated by the commonly used Windows benchmarks. These benchmarks represent the high performance achieved by the Intel Pentium processor running 32-bit applications.

CPUmark*32 is a 32-bit processor level benchmark provided by Ziff-Davis Labs designed to measure the processor performance potential running 32-bit applications.

Figure 1 illustrates the Intel mobile Pentium® Processors with MMX™ Technology performance when executing this popular 32-bit benchmark.

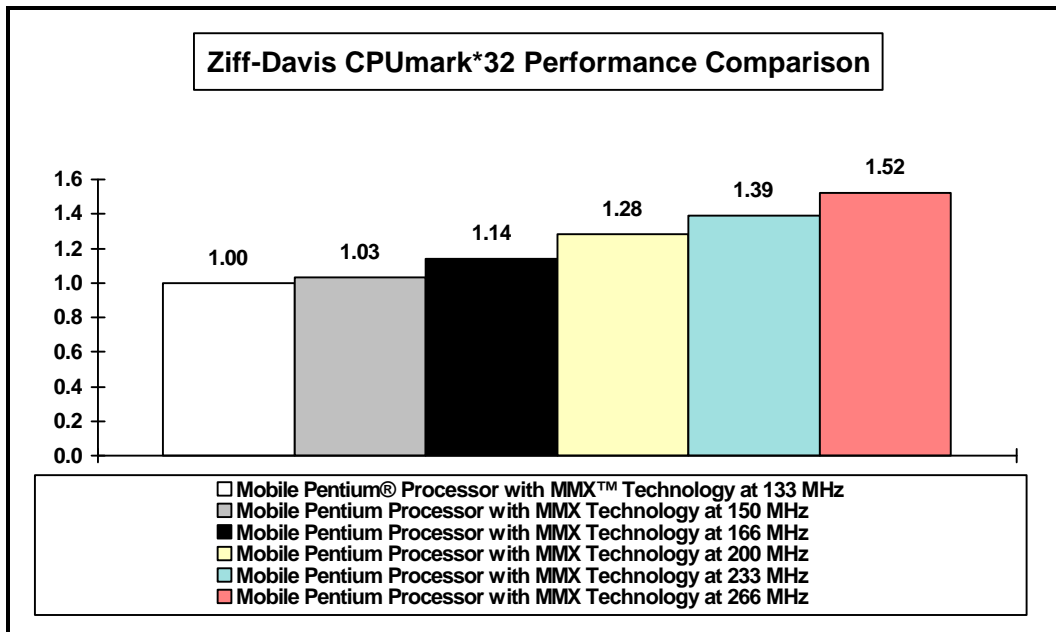


Figure 1. Mobile Pentium® Processor with MMX™ Technology Performance for the Ziff-Davis CPUmark*32 Benchmark



NORTON* MULTIMEDIA BENCHMARK

The Norton* Multimedia Benchmark tests a system's multimedia capabilities and compares the performance to that of a system conforming to the basic Multimedia PC Level 2 (MPC2) specification. The benchmark reports performance in five multimedia areas:

- **Video** benchmarks video performance. It measures MPEG video decompression and AVI video frame rates.
- **3D** tests rendering capabilities.
- **Audio** measures audio mixing and MPEG audio performance.
- **CD-ROM** measures the CD-ROM drive's maximum seek and transfer rates.
- **Imaging** tests image processing manipulations.

The Norton Multimedia Benchmark overall score shows a system's overall multimedia performance rating compared to a standard MPC2 system.

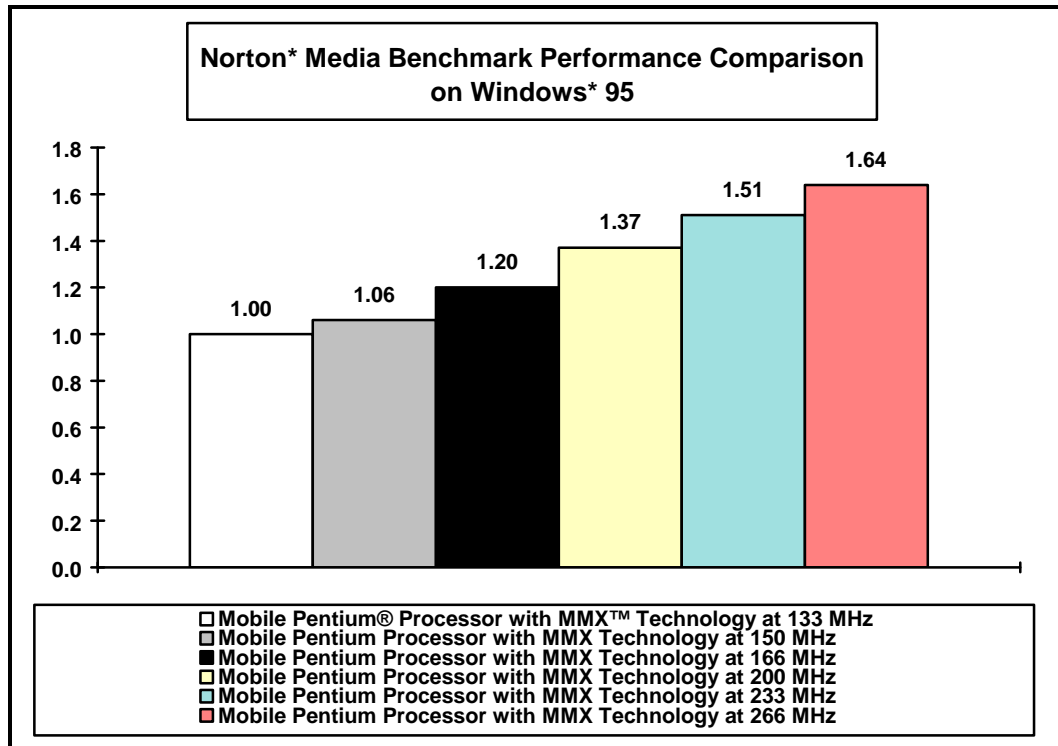


Figure 2. Mobile Pentium® Processor with MMX™ Technology Performance for the Norton* Multimedia Benchmark

3D WINBENCH*97 BENCHMARK

The 3D WinBench*97, from Ziff-Davis, measures the 3D performance of a system using Microsoft's Direct3D* interface under Windows*95. The 3D pipeline includes 3D geometry calculations, which are floating-point intensive, and rasterization. It includes a series of 10 tests that vary in both complexity (the number of triangles they use to form their objects) and the number of quality enhancing options (such as fog and striking highlights) they employ. Each test flies through a scene using a predefined path and measures the rendering speed in frames per second.

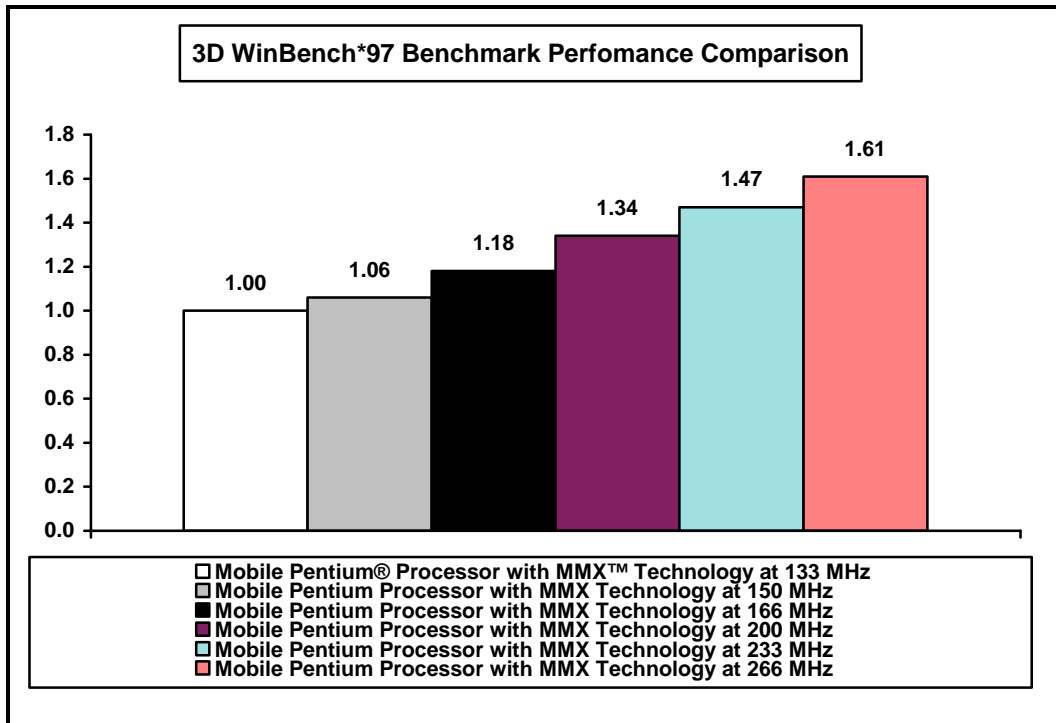


Figure 3. Mobile Pentium® Processor with MMX™ Technology Performance for the 3D WinBench*97 Benchmark



SUMMARY

Table 1 summarizes the microprocessor benchmark relative performance results for the mobile Pentium® processors with MMX™ technology discussed in this performance brief.

Table 1. Mobile Pentium® Processor with MMX™ Technology Benchmark Results

Benchmarks	Speed/ Performance	133 MHz	150 MHz	166 MHz	200 MHz	233 MHz	266 MHz
CPUmark*32	Integer	1.00	1.03	1.14	1.28	1.39	1.52
Norton* Multimedia	Multimedia	1.00	1.06	1.20	1.37	1.51	1.64
3D WinBench*97	Floating-Point	1.00	1.06	1.18	1.34	1.47	1.61



APPENDIX A — TEST CONFIGURATIONS

System Configuration for Mobile Pentium® Processors with MMX™ Technology at 133/150/166/200/233/266 MHz

Processor	Pentium® Processor with MMX™ Technology - 133, 150, 166, 200, 233, 266 MHz
Board	Intel 82430TX PCIset based mobile motherboard
Primary Cache	16-Kbyte (Instruction) 16-Kbyte (Data)
Secondary Cache	512 Kbyte SRAM (WB Burst)
Memory Size/Speed	32 Mbyte SDRAM/60ns
Motherboard Chip Set	Intel 82430TX
BIOS	AMI30
Hard Disk	Toshiba 1.3G
Operating System	Windows* 95
Video Controller/Bus	Chips & Technology* 65554/PCI
Graphics	640 x 480 Resolution, 256 Colors



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