Spherical Solutions

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"Pyro" 50 Mhz Accelerator Board

Introduction

Spherical Solutions first explored the possibility of producing an accelerator card for 68040-based NeXT computers in early 1994. We approached one of the leading manufacturers of accelerator products for the Macintosh computer, and they expressed considerable interest. By July, working closely with us, they produced a working prototype.

NEXTSTEP community suggests tests

In early July, Spherical Solutions asked readers of the comp.sys.next.hardware Usenet newsgroup to suggest appropriate tests of the accelerator board performance. The response was very helpful. Correspondents agreed that general-purpose benchmarks would not give an adequate picture of the accelerator's performance. Over two dozen individuals suggested applications that would demonstrate the real-world performance of the accelerator product.

Testing by an independent consultant

Sam Goldberger, the owner and president of Spherical Solutions, wished to obtain accurate performance data before committing to full-scale production of the accelerator product. Clearly, potential purchasers of the product would also want to see accurate and reliable performance data. So in September, Sam Goldberger asked Daniel Miles Kehoe of Fortuity Consulting, a contributing editor of NeXTWORLD magazine and an independent marketing consultant, to conduct tests of the accelerator's performance.

The tests

Kehoe reviewed suggestions made by the NEXTSTEP user community and identified a suite of tests that reflected a consensus of user opinion and focused on processor performance. The community was interested in standard performance benchmarks, including dhrystone and MIPS measures, as tested by the standard NXBench and Byte BenchMark suites. Suggestions also included tests of real-world performance with processor-intensive operations using popular NEXTSTEP applications. Kehoe developed a test suite that included:

--Sorting a 5000-item mailbox in NeXT Mail;
--The standard Mandelbrot demo application;
--Search-and-replace in a large FrameMaker file;
--Image manipulation in WetPaint;
--Image manipulation in Virtuoso;
--3-D rendering, using the prman utility;
--Conversion of an image from GIF to JPEG formats, using the cjpeg utility.

Kehoe also tested compilation speed. Typical compiling operations are constrained more by speed of access to disk files than by processor performance. Testing of compiling speed served two purposes: First, the user community wanted to know if the accelerator card offered any advantage in compiling. Second, tests of compiling provide a good indication of the accelerator card's performance with the many applications that do not perform processor-intensive operations.

The consultant's conclusions

Kehoe drew the following conclusions from the tests. First, he found no incompatibilities with any application or function. He noted there was ample reason for Spherical Solutions to expect that the user community would find value in the product. Specifically, the accelerator product improved processor performance an average of 66% relative to the standard (25 MHz) 68040-based NeXT cube and NeXTstation with a suite of seven processor-intensive operations in real-world applications. Improvements in compiling and (presumably) other disk-intensive operations were not as pronounced, relative to the standard 68040-based NeXT computers. The product also showed improvements averaging 23% in processor-intensive operations relative to the Turbo (33 MHZ) NeXT cube and NeXTstation, but disk-intensive operations were slightly slower, presumably because Turbo motherboards offer better disk access speed than the 25 MHz NeXT motherboards.

Kehoe also tested performance of the Pyro accelerator card relative to a privately-owned prototype of the legendary Nitro NeXTstation, which never went into actual production. The Pyro accelerator card was faster than the Nitro on standard benchmarks and on a few real-world tests, including the Mandelbrot, WetPaint, Virtuoso, and JPEG conversion tests. On average, the Pyro accelerator card closely matched the legendary Nitro performance, though the Nitro outperformed the Pyro accelerator card on disk-intensive applications, presumably because, as with the Turbo, the Nitro disk access is superior.

In general, Kehoe observes, "Owners of the 25 MHz 68040-based NeXT computers will notice a significant performance gain using the Pyro accelerator card on operations that require pure processor performance. The computer feels snappier with the Pyro. However, operations requiring heavy disk access will not improve greatly. "You'll want the Pyro card especially if you perform image manipulation, number-crunching, or other processor-intensive operations."

Kehoe concludes, "The Pyro accelerator card significantly improves the performance of a standard 25 MHz NeXT cube or NeXTstation. It delivers processor performance comparable to the legendary Nitro workstation."

Additional Information

When available, the Pyro board will plug into the NeXT motherboard in place of the 68040 chip. It will be available in different form factors for the NeXT Cube, Mono Station, and Color Station. For those whose '040 CPU is socketed, a tool will be provided to remove the chip, and replace it with the Pyro board. For those whose CPU is socketed, a motherboard exchange program will be available. No additional software is required, and original memory can be preserved.

Introductory price will be $899 plus shipping. Projected availability is February 1, 1996. For further information, please contact Spherical Solutions.

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