# REVIEWS

#### HARDWARE

## The Nextstation: A High-Performance Graphical Workstation with a PC Price Tag

#### **STEVE CARPENTER**

There's no question that Next makes an avant-garde machine. The original Nextcube had a unique set of features that made it "one of the most eagerly anticipated machines in recent memory." (See "The NeXT Computer," November 1988 BYTE.)

But there were some serious problems with the original Nextcube. First, the \$10,000-plus price tag put the first Next system beyond the reach of many budgets. Then, the features that made the original Nextcube so attractive slowed down the 25-MHz 68030 and optical drive combination to the point that some people were disappointed with its performance. Finally, although the Nextcube had some fantastic native applications, there weren't enough third-party applications available to justify many enduser purchases. (See "Sizing Up the Cube," January 1990 BYTE.)

But that was then. Now, the new Nextstation leaves the original Nextcube's problems in the dust. And if Next overcomes its marketing and distribution problems before Apple, PC vendors, or workstation vendors field a competitive model, the competition could be in for a big surprise.

#### **The Reality Zone**

The lessons Next learned about the impact of pricing have certainly come home to roost. An entry-level Nextstation with 8 megabytes of memory, a 2.88-MB floppy disk drive, and a 105-MB hard disk drive (the interesting but pricey optical drive is gone) lists for an affordable \$4995. This configuration is competitive with other vendors' entry-level diskless machines. But although this configuration is usable, for the kind of work this machine was meant to do, more is better. I reviewed a system with 16 MB of RAM and a 406-MB hard disk drive. The cost of that configuration is still very aggressive at \$7275.

The 17-inch, 1120- by 832-pixel MegaPixel display is almost the same as the one shipped with the old Nextcube, but the Nextstation's CPU housing has



The Nextstation is more practical in case design, performance, and price.

shrunk from a 1-foot square to a 2<sup>1</sup>/<sub>2</sub>inch-high pizza-box shape. This has the effect of reducing the awe-inspiring black cube to a (more functional) monitor stand. Despite this diminished profile, Next promises at least three times the performance of the Nextcube, thanks to a powerful combination of 68040 CPU, cache, integrated channel processor, 56001 digital signal processor, and a fast hard disk drive instead of the optical drive. I figured I was in for a treat.

The other issue for Next was stimulating application development. Next has been aggressive here, too. All the workstation vendors advertise thousands of applications, but only a fraction of the applications actually take full advantage of a graphical environment.

Next takes a different approach to applications, one that reflects its avantgarde focus. First, it developed Next-Step, its acclaimed visual objectoriented programming environment (see "The Next Step," March 1989 BYTE). Second, all applications in Next's catalog use NextStep. As of March, according to Next, 43 third-party NextStep applications, including Lotus's revolutionary Improv speadsheet, are shipping (see "What's NeXT After 1-2-3," October 1990 BYTE, for details on Improv).

Also, Next bundles another eight major integrated applications packages, including the multimedia Nextmail, and at least a dozen more useful demonstration (unsupported) packages that you have to see to believe. With all this taken together, the Nextstation is probably a more useful machine out of the box than any other workstation on the market, and quite possibly any system in its price range, including PCs and Macs.

#### **Close Encounters**

I dove right in to get some first impressions. My first excursion involved logging on as the supervisory user "root." This brought up the familiar Next workspace screen: a menu bar to the left, a file browser in the center, and, to the right, a set of applications icons "docked" along the side of the display. But no terminal window was visible; as a longtime Unix user, I felt a little out of place.

A quick tour through the documentation was helpful, but it seemed to consist mostly of guide rather than reference materials. This is documentation that you must read completely to find the information you might need, not something to

## **EVIE** ACTION SUMMARY

- WHAT THE NEXTSTATION IS A fast, inexpensive monochrome Unix workstation.
- LIKES

Excellent graphical interface; usable "out of the box" with bundled applications.

#### **DISLIKES**

Its nonstandard Unix, network administration, and windowing system might create some headaches for those with existing Unix systems.

#### RECOMMENDATIONS Possibly the best workstation value on the market, and a good

choice for first-time Unix users.

\$7275 (as reviewed)

#### FOR MORE INFORMATION

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breeze through. It's not a chore, though, because the documentation is well organized. For avid bookhaters, Next has an on-line librarian that helps you find what you need, and includes a nice multimedia tour conducted by the pleasant-voiced Ms. Cathy.

I got my terminal window running and started poking around. A quick tour told me that this was indeed a Berkeley Unix system. I became a little distressed when I couldn't find the vertical bar (pipe symbol) key. I finally found it on top of the right key cluster—not a good place if you want to use the Unix system interface. Surprisingly, Next moved the key from the more reasonable position on the original Nextcube's keyboard.

I then set up the original Nextcube beside the Nextstation. Whereas the Nextcube takes several seconds to build the workspace, the Nextstation, with 16 MB of RAM and a fast 406-MB hard disk drive, starts up almost immediately. Opening an application window was a slow process on the Nextcube, but windows pop up quickly on the Nextstation. Running in this environment with several open applications seemed to have no noticeable effect on graphics performance. In contrast, just moving one window on the Nextcube completely stopped a file scrolling in another window. Checking the BYTE benchmark results at right confirms that feeling.

From this user's perspective, the Nextstation lives up to the workstation performance I've come to expect. So it's safe to say that Next kept its promise of exceptional system throughput and performance and laid to rest the performance problems of the original Nextcube. Expanding on this good news, Next recently announced a family of Next systems, as well as a 68040 upgrade board for the original Nextcube (see "Fast New Systems from NeXT," November 1990 BYTE).

#### **Stacking It Up**

In doing a review, it's ideal to compare the reviewed system with like systems from other vendors, but it's hard to come up with competing systems that have much in common with the Nextstation. The Nextstation has the competition beat right now in price and standard features. However, that set of features will become commonplace in the coming years, and you can configure competing systems now with third-party products that offer similar capabilities. So to get a rough idea whether the Nextstation is indeed a price/performance bargain in its class, I compared a Nextstation with systems that

### UNIX BENCHMARKS



HIGH-LEVEL PERFO	INMANOL			Time	Fime Index		Time
* C Compiler	2.15	0.97	* Dhrystone 2			Throughput	
* DC Arithmetic	0.23	2.74	(without registers; Dhry./sec.)	23850	1.72	(5 x 4000 calls)	0.50
* Tower of Hanol (17-disk problem)	0.42	1.33	(10,000 iterations) Arithmetic overhead	0.21	3.43	Pipe throughput (read and write 2048- × 512-byte blocks)	0.72
1 background process 2 concurrent background	3.53	1.15	Register Short Integer	3.22 2.90 3.20	0.91 1.21 0.98	Pipe-based context switching (2 × 500 switches) Process stration (100 forks)	0.42
processes 4 concurrent background	4.80	1.21	Long * Floating Point	3.20 3.52	0.98 3.39	Execl throughput (100 execs)	3.15
processes	7.57	1.27	Double	3.52	3.76	Filesystem throughput (10-second test in Kbytes/sec.)	
processes	13.23	1.31				Read Write	833 576

Cumulative index is formed by summing the indexed performance results for C Compiler, DC Arithmetic, Tower of Hanoi, System Loading (with 8 concurrent processes), Dhrystone 2, and Floating Point tests.

1 System loading was performed using Bourne shell scripts and Unix utilities.

Note: All times are in seconds unless otherwise specified. Figures were generated using the BYTE Unix benchmarks version 2.6. Indexes show relative performance; for all indexes, an Everex Step 386/33 running Xenix 2.3.1 = 1. N/A = Not applicable. For a description of the benchmarks, see "The BYTE Unix Benchmarks," March 1990 BYTE.

I thought would have most of the performance and a similar configuration and be in the under-\$10,000 price class. On that basis, a high-end Macintosh, a highend i486-based system, and a low-end workstation should all be candidates. I was in for some more surprises.

The Mac IIfx running A/UX version 2.0, although beating the original Nextcube soundly in the BYTE benchmarks, clocked in at 50 percent to 60 percent of the Nextstation's performance. One IIfx configuration with 8 MB of RAM, a keyboard, a 210-MB Quantum drive, and a 19-inch display lists for \$12,125. Of course, some dealers have packages offering significant discounts. After adding high-quality audio, Unix, and Ethernet, the best current Apple system costs more than twice as much as a base Nextstation and offers less performance.

Then I turned to PCs. A 486/33 beats the Nextstation in some of the BYTE benchmarks, but it still lists at close to \$10,000 without the add-ons needed to match the Nextstation's best features. There was no need to carry this configuration exercise any further.

Next identifies Sun Microsystems as

its main competitor in the commercial workstation market. In that comparison, Sun's low-end systems (including the \$9995 color IPC with a 207-MB hard disk drive) fare relatively well, performing only slightly worse than the Nextstation. But Sun systems lack the bundled applications and general ease of use of the Nextstation. It will be interesting to see if Next's 68040-based systems can take any steam out of SPARC's commanding lead.

#### The Next to the Last

Despite my obvious affection for the Nextstation, it isn't perfect. Steve Jobs' vision of the needs of the commercial workstation user didn't have room for either the X Window System or System V Unix, both of which are becoming increasingly important. Users expect to be able to connect their various workstations, and the Nextstation, with its unique Mach/Berkeley Unix and proprietary windowing system, has a little trouble fitting in with non-Next hardware. Next, along with its third-party software vendors, has plans to address this (including a commercial version of X Window that runs under NextStep).

Next excels in providing excellent value for the money. A first-time computer buyer would be well advised to consider the Nextstation, because even a fast PC can't equal the Nextstation's bundled applications and point-and-click simplicity. Insignia's SoftPC product adds DOS application compatibility. Mac users will feel very much at home in NextStep, and the crisp gray-scale monitor is perfect for technical publishing. Those who have al-ready invested in Unix workstations should perhaps tread a little more carefully, but with X Window added, the Nextstation could be a cost-effective and valuable addition to an existing network.

ne Index

15

2.20

1.28

1.50

0.56

1.09

N/A

N/A N/A

In many ways, Next has redeemed itself by finally releasing a system equal to the task of running its demanding operating-system and graphical-environment software. The Nextstation, along with its array of standard software, is wholly impressive.

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