Fast New Systems from NeXT

The new NeXT systems sport lower price tags, more speed, and a long-sought floppy disk drive

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Photo 1:
Unlike the original NeXT Computer, the new Nextstation Color features a slim-case, or "pizza-box," system unit. Inside is a powerful 68040 processor and 12 MB of RAM.

In addition to considerable fanfare and praise, the original NeXT Computer received a fair share of criticism. It had been faulted for its lack of color options, high price, a perceived lack of performance, and—most often—its lack of a floppy disk drive. With the new NeXT systems that were introduced in September, NeXT has built on its past achievements and addressed the majority of these weaknesses.

NeXT now has a product line that features the new 68040 microprocessor running at 25 MHz, an MS-DOS-compatible 2.88-megabyte floppy disk drive, a new "slim-case" desktop model that retails for the relatively low price of $4995, and color options due out early next year.

According to NeXT's numbers, the 68040 has a performance rating of approximately 15 million instructions per second and 2.8 million floating-point operations per second (MFLOPS), about three times faster than the 68030 used in the original NeXT Computer. The 68040 also includes memory management and floating-point coprocessors on the main chip.

When the NeXT Computer was introduced in 1988, one of its primary features was an erasable 256-MB optical disk drive, which Steve Jobs touted as the floppy disk drive of the nineties, allowing users to "take their whole world in their backpacks." But the optical drive has proved to be too slow for use as a main storage device, and the cartridges are too expensive for use as a data-exchange medium: No one wants to send a file on a $50 storage medium. In addition, the price of the optical cartridges jacks up the price of third-party software. Nevertheless, the optical

drive is excellent as a backup device and will be offered as an option for that purpose.

The floppy disk drive of the nineties is now the good old 3½-inch drive, but with an increased capacity of 2.88 MB and the capability to read and write files in 1.44-MB and 720K-byte MS-DOS formats. This floppy disk drive is now standard equipment on all NeXT machines and will be the primary medium for the distribution of software and data. The new NextStep operating-system software automatically mounts the floppy disk and displays its files in the system's Directory Browser. In addition, the software supports CD-ROM drives (see the text box "A New Version of NextStep" on page 167).

While the new 2.88-MB drive cannot read and write Macintosh-formatted files directly, the high-density floppy disk drive (Super-Drive) available on Macintoshes can convert to MS-DOS format; thus, Macintosh file compatibility should not be a big problem.

NeXT's system boards now include a twisted-pair 10-Base-T Ethernet port, as well as the thin Ethernet port that is on the current system board. Another change is the use of the 50-pin SCSI-2 standard rather than the older 25-pin SCSI standard. SCSI-2 offers greater reliability and faster transfer rates than does standard SCSI. SCSI-2 is backward compatible so that existing SCSI devices can be attached using a cable adapter. The new system boards also support parity memory checking, a feature that has been requested by scientific and engineering users.

It should be noted that the new system board still uses

the Motorola 56001 digital signal processor, despite speculation that the new machine would have the 96002 DSP, a successor to the 56001 that includes floating-point capability. NeXT says that the 96002 isn't currently fully backward compatible with software for the 56001. However, NeXT has added a single in-line memory module socket for up to 192K bytes of memory addressable by the DSP.

The Nextstation Pizza Box

The new Nextstation is clearly NeXT's answer to the SPARCstation. Made from magnesium with a cosmetic plastic shroud, the slim-case, or "pizza-box," system unit is about 15 inches square and 2½ inches thick, and it sits under the system's display. The system board is slightly larger than the original NeXT system board; the two are not interchangeable. The board includes two serial ports, a display port, the SCSI-2 port, and both thin and 10Base-T Ethernet ports. The Nextstation is cooled by a virtually silent "whisper fan" that passes air over heat-dissipating fins built into the bottom of the case. These lie directly under the power supply—a major heat source. The power supply is a 120-watt unit that uses a new technology called "parallel resonance switching," which allows a much smaller form factor than conventional power supplies.

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The Nextstation comes standard with 8 MB of memory (expandable to 32 MB), a 105-MB hard disk drive, and the 2.88-MB floppy disk drive. With the 17-inch black-and-white MegaPixel display, this system costs $4995. A reduced version of the operating system is shipped installed on the 105-MB hard disk drive and takes up about 75 MB on the disk, including 16 MB of swap space required for virtual memory mapping by the operating system. Unless connected to a network file server, a system with the 105-MB drive will require an additional hard disk drive for storing much third-party software and data. An internal 340-MB hard disk drive is available as an option instead of the 105-MB drive, in which case the system costs $6995, a rather hefty price increase for an added 235 MB of storage.

The Nextstation is a welcome addition to the NeXT product line. It is ideal for end users who don't need the storage or expansion capabilities of the NeXT Computer. The Nextstation was supposed to begin shipping in October.

A New Cube

The other new NeXT system is the Nextcube, the familiar cube but with a floppy disk drive instead of an optical drive, and space for one half-height and one full-height storage device (either two hard disk drives or a hard disk drive and a CD-ROM or optical drive). The 105-MB and 340-MB drives are half-height devices, while the 660-MB and 1.4-gigabyte units are full-height devices.

The Nextcube system board has the same features as the Nextstation system board, including parity memory and the SCSI-2 and 10Base-T ports, but memory can be expanded on-board to 64 MB. An 8-MB system with the 2.88-MB floppy disk drive, the 105-MB hard disk drive, and the 17-inch monochrome display costs $7995. The 340-MB drive option boosts the price to $9995. The Nextcube was scheduled to ship in September.

Color Options

NeXT will offer two "color solutions": a low-end system for business applications, presentation graphics, and two-dimensional CAD, and a high-end system for scientific imaging, professional graphics production, 3-D modeling, and so forth.

At the low end will be a color version of the Nextstation with 16-bit-per-pixel color, allowing 4096 colors on-screen simultaneously (12 bits for color and a 4-bit "alpha channel" for specifying transparency). At the high end will be an add-in board with 32-bit color, its own graphics processor, and a processor for compressing and decompressing graphics images, allowing 16 million colors on-screen simultaneously (24 bits for color and an 8-bit alpha channel for specifying transparency).

The Nextstation Color

The Nextstation Color (see photo 1) is the same slim-case machine as the Nextstation, except that it supports 16-bit color. It comes standard with 12 MB of RAM and 2 MB of video memory. NeXT increased the memory bandwidth somewhat on this model to improve video performance. The Nextstation Color is designed for use with NeXT's new color MegaPixel display, which is a 16-inch Sony Trinitron display with 1120- by 832-pixel resolution (the same resolution as the black-and-white display). The 12-MB system with the color display, a 105-MB hard disk drive, and the 2.88-MB floppy disk drive will cost $7995. As with the Nextstation, an additional hard disk drive will be necessary unless the system has access to a network file server.

The Nextstation Color does not require NeXT's color MegaPixel display. By purchasing NeXT's ColorConnect adapter, you can connect any size color display that is capable of showing images in the correct resolution. The ColorConnect adapter provides the sound and speaker functions that are normally built into the MegaPixel display. Pricing for the ColorConnect adapter was not available at the time of this writing, but a Nextstation Color without a monitor will cost $4995. There is no upgrade path between the black-and-white Nextstation machine and the Nextstation Color. Unfortunately, the Nextstation Color will not ship until early 1991.

Upgrading Existing Cubes

As NeXT announced several months ago, current NeXT users will be able to obtain a 68040 upgrade for their NeXT Computers for $1495. This will involve swapping the 68030 system board for the new 68040 system board. NeXT has also

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A New Version of NeXTStep

In conjunction with the new hardware in its product line, NeXT is providing a major upgrade to its operating-system software. NextStep 2.0 includes support for the new hardware components, such as the 2.88-megabyte floppy disk drive, CD-ROM drive, color display, and 10Base-T Ethernet, as well as a host of improvements to the interface and development environment.

To accommodate the comparatively small 105-MB hard disk drive that is standard on all the Nextstation models, NeXT has split NextStep into two versions: release 2.0 and release 2.0 Extended.

The extended version includes all the current developer's tools, such as the Application Kit and the Interface Builder, as well as some new enhancements aimed at application developers. However, neither version will include Mathematica, Common Lisp, or the Sybase database manager. Release 2.0, a reduced version of NextStep, does not include the Interface Builder or the Application Kit, and it has a reduced version of Webster's Ninth New Collegiate Dictionary without the illustrations or the full text index. The reduced version also has fewer demonstration programs and does not include the Shakespeare plays or The Oxford Dictionary of Quotations.

NeXT may find that most customers want the extended version and opt for a larger hard disk than the 105-MB unit. However, for networked users who have access to a file server, the reduced version simply reduces the local storage requirements. In any case, release 2.0 and release 2.0 Extended are functionally equivalent so that users will be able to move to the extended version simply by installing a larger disk capacity and copying the missing files.

An Improved Interface

NextStep 2.0 addresses several major weaknesses of release 1.0. Of particular importance, the Workspace is now multithreaded so that file operations such as copying and moving can be done in the background, allowing the user to continue working on other tasks.

The printing interface has also been redesigned to operate at a lower priority so that the screen doesn't lock during print operations. The tradeoff is slower printing performance in exchange for a live screen. In addition, the printer interface now includes an option for sending fax documents. If you have a fax modem, you can fax anything that can be printed by simply clicking on the new Fax option in the Print menu.

The Workspace has received some cosmetic changes in release 2.0. The Directory Browser has been redesigned and now includes a "shelf" at the top of the browser window where users can place frequently used files and folders. The Browser also includes a new window that shows the "icon history," or status, of applications and folders that are in use. Clicking on an icon in the window displays the path of the file or the folder graphically in the Directory Browser. The icon history window replaces the icon well in the current Directory Browser.

The Mail application has been improved in release 2.0. Mail now includes an archive facility for storing mail messages. A return receipt function has been added, as well as support for sending mail to recipients with non-NeXT systems that require a standard font, wrapped lines, and carriage returns for 80-column text. Release 2.0 includes spelling checking and rulers built into the Text Object, so that these features are now supported in Mail.

The development environment has been improved in release 2.0 and includes support for color. A new object called the Color Picker works similarly to the font panel and allows you to select and mix colors. The window server supports frame buffers of different size and depth to accommodate the use of third-party color monitors. NeXT plans to support the RenderMan scene-description language for three-dimensional rendering in a future release of NextStep, due early next year.

Release 2.0 supports loadable device drivers, allowing developers to create custom applications for peripherals like video and sound equipment and special-purpose display and output devices. All text objects now automatically include a spelling checker and rulers.

Other new features include an improved MIDI driver that supports arbitrary sampling rates and PostScript composite fonts, a feature of Adobe's PostScript level 2. Composite fonts allow support for kanji and other alphabets.

Availability and Upgrades

NeXT was optimistically hoping to have release 2.0 ready in September. At press time it was still not finished, but NeXT was confident it would be ready in time. In any event, the new machines won't run without it, so completion is a top priority.

The system software will be shipped preinstalled on hard disks, relieving the user of the time-consuming Build Disk operation. Current users of release 1.0 will be able to upgrade to 2.0 on an optical drive for $195, which includes new manuals.
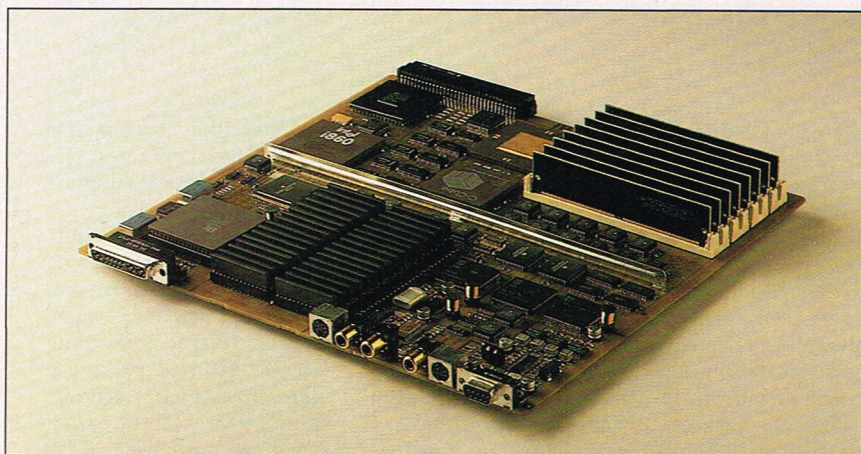
Photo 2:
*The Nextdimension board provides
the Nextcube with high-performance color graphics. On the board is
an Intel i860 RISC processor,
4 MB of video RAM, and room for
up to 32 MB of memory.*

contracted with a third-party supplier to provide an external 2.88-MB floppy disk drive for current NeXT Computer owners. Pricing and availability of the floppy disk drive have not been announced as of this writing, but, according to sources at NeXT, it will be available within the next couple of months.

To go along with all this new hardware, NeXT is cutting the price of its high-resolution 400-dot-per-inch laser printer almost in half. Originally selling for a retail price of $3495, the printer is now priced at $1795, representing a substantial reduction in the cost of a complete NeXT system.

Doing Color Right
NeXT president Steve Jobs promised from the beginning that NeXT would eventually support color, but not until it's "done right." And indeed, NeXT has done color right. Using the PostScript imaging model, color on the NeXT is device independent; in other words, applications written using color PostScript specifications can be displayed on any output device that supports PostScript, whether it's a screen or a printer supporting black and white, gray scale, or various resolutions of color.

In addition, PostScript offers excellent performance in color. When you compare Color QuickDraw on the Mac IIfx and color PostScript on a 68030-based NeXT Computer, you find that screen refresh and movement of color images are much faster on the NeXT. And, unlike with Apple's QuickDraw and TrueType image and font models, there is no need

for conversion routines to display PostScript images on PostScript devices.

High-End Color: The Nextdimension
NeXT's high-end color solution is an add-in board called the Nextdimension (see photo 2). The board plugs into one of the three NextBus slots in the NeXT Computer, and it features Intel's i860 microprocessor, which is rated at 80 MFLOPS and offers high-speed graphics processing. The board has 4 MB of video memory, plus up to 32 MB of RAM for increasing the display's windowing capacity (i.e., the number of windows that can be displayed on the screen simultaneously).

In addition, the board includes the C-Cube Microsystems CL550 image-compression processor, which can compress video and bit-mapped images in ratios of up to 30 to 1 using the Joint Photographic Experts Group image-compression algorithm. The board supports NTSC and SVideo (SuperVHS and High 8mm) images for both input and output, as well as RGB color. One 640- by 480-pixel window can display live NTSC or SVideo images. In conjunction with the C-Cube image-compression processor, the live window can display 30 frames per second for true real-time motion video.

Like the Nextstation Color, the Nextdimension supports the new color Mega-Pixel display and, using the ColorConnect adapter, third-party color displays. The color display can run simultaneously with the black-and-white MegaPixel display, allowing a contiguous work space

consisting of the two screens. Images or text can be dragged from one screen to the other as if the two screens made up a single display. For intense graphics users, up to three Nextdimension boards can be installed in one NeXT Computer, each with a separate monitor.

The Nextdimension will be priced very competitively at $3995, which includes 8 MB of RAM. A complete color system (a Nextcube with the color Mega-Pixel display and the Nextdimension board) will cost about $15,000, making the system very competitive with similar systems from Sun and Apple. The Nextdimension should ship early in 1991.

High-Speed Color at a Low Cost
These new systems and the updated NextStep software give NeXT a very powerful, well-rounded, and extremely competitive product line. The Nextstation system may now be the workstation price/performance leader. A Nextstation with a laser printer makes a powerful desktop publishing setup.

But where NeXT has really taken a lead is in the color arena. NeXT's decision to go with Display PostScript is paying off in a big way. The system has one consistent model for both displaying and printing. And, despite rumors to the contrary, its performance is outstanding.

The new NeXT systems are going to be extremely competitive with high-end desktop personal computers, especially high-end Macintoshes. The products will also compete well in the low-end workstation market. And since educational establishments and developers continue to get a 30 percent discount, these systems will be even more competitive in universities.

Perhaps the biggest task left to NeXT is to persuade software vendors to write programs for NeXT systems. But that is changing, as Lotus and Ashton-Tate have announced new spreadsheet programs in conjunction with the new systems' introduction in September. Lotus's spreadsheet in particular shows why the NeXT systems are so important. The program is completely innovative in every way and is pointing the way ahead for the future of software and hardware—just like the NeXT machines themselves are. ■

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