

Apple Confidential / Need to Know

From: Michael Mace, Jon Holtzman, Steve Katz

New Sun Products: Not Yet Personal Computers (4/89)

## Summary

On April 12, Sun announced three new RISC-based workstations, and two new 68030-based products. Most are available configured as workstations or servers. The most important of these products is probably the SPARCStation 1, the first RISC-based computer we've seen with a list under \$10,000 (although fully-configured systems will probably be about \$12,000 to \$15,000).

The new products range in base price from under \$6,000 (for a diskless 68030-based system) to over \$40,000. They constitute a strong price-performance challenge to the rest of the workstation industry, and will probably put some pressure on the high-end PC world where it overlaps with workstations. This should be a long, hot summer for all of the workstation vendors.

In the longer term, we think Sun hasn't given up on its dream of entering fully the PC market. The company had hinted strongly that it would go after PCs this year, but backed away from the market after technical problems developed in its PC projects, and competition increased in the workstation industry. For the moment, Sun has apparently decided to stick to its core business. But we wouldn't be surprised if Sun tried again in a year.

Apple strengthens its position by articulating the many elements that make Macintosh the best personal computer system in the world. The Macintosh advantage is not just user interface (which we still emphasize in a lot of our communications), but the many ways in which the hardware, OS, and applications work together to produce unique benefits for the user. This advantage is something Sun won't be able to overcome readily, even after another year of development.

## Specifications

### New RISC Products

The three RISC-based machines are as follows:

SPARCstation 1: 20 MHz SPARC, 12.5 MIPS claimed, 3 "SBus" connectors

Default configuration: Diskless, 17" mono, 8 MB. \$8,995.

This system is smaller than a standard PC (it looks a lot like a pizza box), includes DOS emulation and digital audio software (a first for Sun), a 3.5" floppy drive, a speaker, and an audio jack. Sun says the motherboard is smaller than 8.5" by 11", and has less than 50 components. It incorporates a lot of VLSI. It uses about the same amount of power as a 100-watt light bulb (they say that's half the power usage of a typical PC). The expansion cards, mounted horizontally, will be "about the size of a postcard"—which means they will be either limited in functionality or very expensive to produce.

SPARCstation 330: 25 MHz SPARC, 16 MIPS claimed, 5 slots.  
Default configuration: 327 MB HD, 19" mono, 8MB. \$29,900.

This unit comes in a two-foot high "pedestal" case, and can accommodate a maximum of 40 MB of RAM and 1.3 gigabytes of SCSI mass storage (disk and tape).

SPARCstation 370: 25 MHz SPARC, 16 MIPS claimed, 12 slots.  
Default configuration: 327 MB HD, 150 MB tape, 19" mono, 8MB. \$40,900.

This one's in a bigger pedestal, with a maximum of 56 megabytes of RAM and 5.5 gigabytes of SMD mass storage.

### New 68030 Products

There are two new 68030-based products, the first Sun machines to use that processor:

The Sun 3/80: 20 MHz, 3 MIPS claimed, 1 "expansion connector."  
Default configuration: Diskless, 17" mono, 4 MB. \$5,995.

This CPU includes DOS emulation capabilities and a 3.5" floppy drive. It uses the same desktop case as SPARCstation1, and also makes extensive use of VLSI. The lack of additional slots is something of a surprise, as is the limited standard RAM. A diskless system with only four megabytes of RAM will probably be slowed considerably by the need to manage virtual memory via Ethernet.

The Sun 3/470: 33 MHz, 7 MIPS claimed, 12 slots.  
Default configuration: 327 MB HD, 150 MB tape, 19" mono, 8 MB. \$40,900.

This is a deskside unit, much more like a traditional workstation. Sun reportedly barely managed to get the 33 MHz version ready in time. There was a backup plan to use 25 MHz.

Please see the Appendix A at the back of this document for additional

specifications. Appendix B has photographs. Note that there are also server configurations for all the desktide machines.

## Availability

60 to 90 days? The day after the announcement, Sun's salespeople hadn't even received pricing for the various accessories yet. Delivery on most of the machines is promised 60 to 90 days after the order (that's Sun's standard preparation and delivery time). However, we're beginning to hear rumors of production problems. It wouldn't be surprising if the delivery schedule slipped some.

## Graphics Acceleration

New emphasis. Sun announced a new "GX" graphics acceleration technology. The accelerator consists of two ASICs: a "frame buffer controller" and a "transformation engine and timing controller." Between them, the two chips support such functions as quadrilateral rendering, matrix mathematics, clipping, and hardware-level cursor support. Sun says special attention was paid to speeding up PostScript, X11, and Open Look commands.

By increasing its emphasis on graphics, Sun acknowledged an important trend in the workstation industry. If its systems actually deliver the performance Sun claims they will, they should be very competitive. However, Sun's benchmarks are notoriously deceptive. More on that below.

## Video

First try unimpressive. SunVideo is a new video board which can be used with any of Sun's desktide machines (but NOT the new 3/80 and SPARCstation 1). It allows the user to display "true-color, full-motion video" in a window on the workstation screen. It supports five fixed magnification levels (full size, 1/2, 1/4, 1/8, 1/16), but does not support sound. There appears to be no support for mixing video with images generated by the workstation, the price is \$12,900, and availability is 120-150 days after receipt of order. We are not impressed by the features and pricing of this product.

## Software

Sun's new desktop. Sun renamed all SPARC-compatible software "SPARCware™," and announced Open Windows, the desktop environment for Sun's Open Look graphical interface. Open Windows will be an option for all

the new Sun workstations. The environment includes an iconic file manager, an e-mail tool, a snapshot tool for taking screen shots (a function Sun calls unique), an ASCII text editor, an icon editor, a clock, and a graphical performance meter. Although announced, Open Windows is not yet shipping; Sun says it will be "fully available later this year." (For photographs, see the appendix to this document).

Development kit. For developers, Sun announced a SPARCware Development Kit, which is set to include a SPARCstation 1 GX, Unix, Open Windows, DOS emulation, and network record manager. The kit will cost \$9,995. It is scheduled to be available in 60 to 90 days (those in a hurry can order it immediately and substitute a Sun 4/110 for the SPARCstation).

Application availability. Sun claims that the number of SPARCware applications is now over 500, which it says is more than the total number of applications compatible with all other RISC systems. However, very few of those programs are productivity applications, and only three (all from Sun) use the Open Look interface. The others are just Unix ports to the SPARC processor.

1989 will probably be a key year for Open Look acceptance. It has not gained a lot of developer support yet, and the OSF/Motif interface, endorsed by most of Sun's workstation competitors, may have more momentum because of its similarity to Presentation Manager.

## Performance

Sun's self-reported performance benchmarks are notoriously unreliable, so it will be impossible to assess the performance of the new products until third parties get their hands on them. The Open Windows interface occasionally looked slow during demos, but that wasn't too surprising since the software is not yet finished.

Macintosh comparisons deceptive. The company reported an extensive series of price-performance comparisons against competing machines, including one against Macintosh. Many of the comparisons were blatantly twisted in Sun's favor. For instance, in the comparison against Macintosh, the Macintosh was configured with eight megabytes of memory even though it doesn't need that much, and Sun compared the three-slot SPARCstation 1 against the six-slot Macintosh IIX instead of the less expensive three-slot IICX.

Graphics benchmarks also unreliable. But some of the most confusing benchmarks were in the comparison between the SPARCstation 1GX (Sun's low-cost graphics machine) and the Silicon Graphics Personal Iris (probably the most popular low-cost graphics workstation in the world today). Sun claimed to draw 400,000 2-D vectors per second and 175,000 3-D vectors

per second, performance substantially beyond that of the Personal Iris.

However, on closer examination, Sun apparently compared its performance in drawing unshaded lines against the speed of the Personal Iris drawing shaded lines. That's like comparing the painting speed of two artists, one using a spray can and another using a tiny camel's hair brush. The one with the spray can paints a lot faster, but the other produces better art.

## Impacts & Implications

### Yet More Competition in the Workstation World

Say hello to the Big Five. We seem to be seeing the emergence of a top tier of workstation vendors who have the financial muscle to duke it out with Sun. The "Big Five" includes Sun, of course. DEC is definitely in the first tier, and IBM could be, once it gets its workstation act together. Solbourne, with the almost limitless resources of Matsushita backing it, is probably also destined to stick around for a while.

The other big contender is HP, which just agreed to buy Apollo (the number one workstation maker until Sun knocked it off). The combined company will probably be the world's biggest workstation vendor for a short time, although Sun is very close (each will have about 30% of the market). But even if Sun retains its #1 status, the deal figures to benefit HP a lot, since it could help them break out of their traditional customer base. In addition, Apollo has been very strong in Europe, and HP likes to operate globally.

Other companies to watch include...

Sony's News workstations haven't sold very well in the US, although they are popular in Japan. Sun's new systems will put a lot of pressure on them here, and may do so in Japan as well (through Sun's strong Japanese alliances). Will Sony stick with it? That depends on how badly they want to be in the computer business. Our hunch is that they will be around for a while.

Silicon Graphics will probably hold onto its niche in 3D systems, but the question is whether it can break out into the general workstation market. We'll have to see what new products the company produces later this year.

### What About Sun vs. NeXT?

The SPARCstation 1 looks as if it was targeted against NeXT in some ways. Even some of the marketing claims are similar—the emphasis on low component count and digital audio, for instance. This will be an interesting competition; Sun will have better raw hardware performance, but NeXT probably has a more sophisticated user interface, plus some sexy stuff like

the DSP chip and optical drive. NeXT also already has a retail distribution arrangement (with Businessland), something Sun has yet to develop.

### Competition with PCs

These are not PCs. In spite of the hype from some industry trade magazines, including Byte, the new Sun machines are not PC competitors. Their impact on Apple's sales will probably be minimal, especially in the short run. Here are three reasons why:

- Pricing. When configured, the new Sun '030 machine will probably cost about \$9,000 and up. The SPARC machines will be well over \$10,000. These are not PC prices.
- Applications. Sun does not have anywhere close to the number of productivity applications it needs in order to be successful in the PC market.
- Distribution. Without access to PC distribution channels, Sun cannot move the volume of machines it must in order to be a player in the PC market.

Apple will probably take some of the usual flack for giving lower hardware performance at a given price point, especially when compared to SPARCstation 1. It's important to point out that a PC is a lot more than a box that runs benchmarks (especially Sun benchmarks). Also, Sun's low base prices are for monochrome systems without hard disks; configured prices are higher.

The areas in which Macintosh might feel the most pressure are probably sales to VARs and higher education, and sales of A/UX. But even there, our more complete user interface, and larger base of productivity applications, give us very important advantages.

### What Happens Next?

Where was the SPARC PC? Until recently, Sun had been expected to enter the PC market this year with a SPARC-based machine targeted directly against Macintosh and other PCs. But Sun's rhetoric, which had been strongly hinting at such a product, changed abruptly at the end of 1988.

We believe the PC project was pushed back in the wake of hardware and cost problems, and the realization that the company's entire efforts were needed in order to fight DEC, Solbourne, NeXT, and the other workstation vendors.

Sun may try again... However, we believe Sun is still very interested in the PC market. The company now positions itself as a business computer firm, not a workstation maker, and its constant quest for rapid growth will almost mandate a move into PCs at some point. At times, Sun even adopts Apple-like slogans such as "changing the world."

A year from now, the cost of the SPARCstation 1 will come down substantially, Open Look will be truly finished, and there will be some third-

party software for it. If the competitive pressure in the workstation industry eases, Sun might well make another run toward the PC market at that time. In preparation for that, we expect Sun to try to develop retail distribution channels sometime this year.

...but must overcome big barriers. But Sun will still face important challenges, no matter when it tries to move into the PC business. It will need a good supply of third-party software, a strong marketing arm, and broad access to the dealer network. None of these things will be easy to get, but we think Sun will try.

What Apple can do. Apple can strengthen its position by articulating to customers the full scope of the Macintosh advantage—not just user interface (which we still emphasize in a lot of our communications), but the many ways in which the hardware, OS, and applications work together to make Macintosh the best personal computer system in the world. This is the sort of advantage that nobody else in the industry can match, no matter how many MIPS they claim to execute.

## Conclusion

Sun is entering a dangerous period in its existence. The company's senior vice-president, Bernard Lacroute, resigned just after the new products were announced. Lacroute managed much of Sun, and is rumored to have quit after being denied a promotion to president. We're beginning to hear reliable reports of organizational problems at Sun—overworked support staffers, unreliable replacement parts, and questions about the company's ability to deliver the new products on time. Sun went through this sort of growth-induced problems before, and emerged stronger than ever. But the company has taken on a lot of new challenges, at a time when several very big competitors are targeting it directly. A major mistake now could cost Sun dearly.

## Appendix A: Specifications.

Here are the specifications for the new Sun machines, as reported in Sun's press releases. The "Dhrystones" figure is a measure of integer calculation performance, taken from the Dhrystones benchmark. The "Linpack" figure is a floating-point calculation speed, derived from the double-precision Linpack benchmark. When examining the pricing, remember that these are base configurations; the average user would add extra hardware before using the machine.

Packaging	Desktop	Deskside	Desktop	Deskside	Deskside
CPU	68030	68030	SPARC	SPARC	SPARC
Clock Spd	20 MHz	33 MHz	20 MHz	25 MHz	25 MHz
Dhrystone	3MIPS	7MIPS	12 MIPS	16MIPS	16MIPS
Linpack	.16 MFLOPS	.6 MFLOPS	1.4 MFLOPS	2.6 MFLOPS	2.6 MFLOPS
Main Mem.	4-16 MB	8-128 MB	8-16 MB	8-40 MB	8-56 MB
Floppy	3.5"	NA	3.5"	NA	NA
Disk Cap.	104 MB- 1.1 GB	1.3 GB 5.5 GB	104 MB- 1.1 GB	327 MB- 1.3 GB	1.3 GB- 5.5 GB
Expansion	1 connector	12 slots	3 connectors	5 slots	12 slots
Cache	NA	64 KB	64 KB	128 KB	128 KB
SW	SunOS-----				
Bundled	NFS-----				
	SunView-----				
Base	4 MB	8 MB	8 MB	8 MB	8 MB
Config.	17" mono diskless	19" mono 327 MB	17" mono diskless	19" mono 327 MB	19" mono 327 MB
Base Price	\$5,995	\$40,900	\$8,995	\$29,900	\$40,900