

Most Significant Bits

TI Announces 50-MHz SuperSPARC+...

After struggling for a year to get its SuperSPARC chip shipping at 40 MHz, Texas Instruments announced its SuperSPARC+ (SS+) processor at speeds up to 50 MHz. The new chip is functionally equivalent to SuperSPARC except that it allows multiprocessor operation through the on-chip MBus interface. (SuperSPARC requires an external cache controller in MP systems.)

SS+ uses a 0.7-micron BiCMOS process to reach the higher clock rate (see [070404.PDF](#)), down from 0.8-micron for SuperSPARC. The new chip is in production, priced at \$1199 at 50 MHz and \$899 at 40 MHz in quantities of 1000, essentially obsoleting SuperSPARC. Deep discounts are available; TI says that "some customers" (i.e., Sun) are paying as little as \$400 for SS+.

Because the CPU must run at the speed of its external bus, operation above the 40-MHz limit of MBus requires the external cache controller, which provides an asynchronous interface between the processor and the MBus. This chip, which is also needed to support a secondary cache, costs \$499 for the 50-MHz version.

When measured in Sun's new SS10/51 workstation, SS+ is rated at 65.2 SPECint92 and 83.0 SPECfp92. Thus, on integer performance it is about the same speed as Pentium and a bit faster than the R4000 but still lags the fastest processors from HP and DEC as well as the imminent 150-MHz R4400. The TI chip lists for about twice the price of an R4000PC, which also offers much less costly cache controllers (see [070501.PDF](#)).

...Which Powers New Sun Workstations

Although SS+ does not surpass the performance of the top RISC chips, Sun will attempt to bridge that gap with multiprocessor workstations. In addition to the \$28,000 Model 51, Sun announced a two-processor, 50-MHz Model 512 for \$34,000, replacing the 45-MHz Model 52 that was announced last May but never shipped in volume. Sun plans to ship the new systems in June. The company plans to begin shipping the 45-MHz, four-processor Model 54 when a TAB-packaged SS+ becomes available in August.

It will be interesting to see how Sun's aggressive MP strategy plays out. Based on SPECrate results, the company claims that the performance of a two-processor system is twice that of a uniprocessor, but this is true only for a carefully selected mix of programs. There is clearly some benefit, however, if one processor handles routine tasks while the other goes full-blast on the user's primary application.

Multiprocessor workstations are most attractive for multithreaded applications, which can run on several processors at once. As MP systems become more prevalent, software vendors will begin coding their applica-

tions to take advantage of them. Thus, the expected increase in desktop MP systems due to Windows NT may improve the sales of Sun's MP products as well.

Intel Prices Edge Downward for 2Q93

Intel's published 1000-unit pricing for the second quarter indicates a 5%–7% average drop for most product lines, as shown in the table below. The major exception is the 486DX line, where prices dropped by only 3%. With no direct competition for these high-end chips, Intel has little incentive to aggressively cut these prices.

Intel Processor	1Q93	2Q93	Decline	Average
i386SX-16	\$39	\$37	5.1%	7.5%
i386SX-20	\$52	\$51	1.9%	
i386SX-25	\$59	\$52	11.9%	
i386SX-33	\$63	\$56	11.1%	
i386DX-25p	\$86	\$84	2.3%	5.4%
i386DX-25	\$91	\$89	2.2%	
i386DX-33p	\$92	\$84	8.7%	
i386DX-33	\$97	\$89	8.2%	
i386SL-16nc/20nc	\$43	\$40	7.0%	7.3%
i386SL-20	\$55	\$51	7.3%	
i386SL-25nc	\$55	\$51	7.3%	
i386SL-25	\$66	\$61	7.6%	
i486SL-25	\$227	\$204	10.1%	10.1%
i486SX-16p/20p	\$91	\$89	2.2%	5.2%
i486SX-16/20	\$118	\$116	1.7%	
i486SX-25p	\$99	\$89	10.1%	
i486SX-25	\$123	\$116	5.7%	
i486SX-33p	\$179	\$168	6.1%	
i486SX-33	\$204	\$193	5.4%	
i486DX-33	\$317	\$306	3.5%	3.4%
i486DX-50	\$469	\$457	2.6%	
i486DX2-50	\$428	\$417	2.6%	
i486DX2-66	\$570	\$542	4.9%	

Note: p=plastic package nc=no cache

Intel has merged the pricing for some of its lower-frequency chips. Pricing for the 386DX-33 is now identical to that of the 386DX-25. In the 486SX family, the 25-MHz version now bears the same price as the 20- and 16-MHz chips. The moves acknowledge that market demand is slipping for the lower-speed parts. For the 33-MHz 386 in particular, AMD's similarly priced 40-MHz version is reducing demand for Intel's part.

Motorola Introduces Low-Power DSP

Motorola has introduced a 3.3V version of its DSP56002, called the 56L002, that reduces power usage from 475 to 165 mW while maintaining the same 40-MHz clock rate. The new chip is software-compatible with the 56001, a 24-bit DSP especially popular in audio applications.

The 56L002 uses the same silicon design as the 56002, which has simply been recharacterized for 3.3V operation. (The ability to run the 3.3V part at the full 40-

MHz rate suggests that the 5V part should be capable of higher clock rates, although no higher-speed versions have yet been announced.) All I/O is at 3.3V CMOS levels; the chip is not directly compatible with 5V logic.

The 56002 is an updated version of the 56001 that includes a double-precision multiplier and multiprocessing capabilities. The 56002 also improved the PLL design and added power-management circuitry to automatically shut off logic and memory blocks that are not in use. These power-saving features are not particularly significant in the standard 56002, which is generally used in line-powered applications, but when combined with 3.3V operation they help make the 56L002 suitable for battery-powered systems.

The DSP56L002 is in production now and is priced at \$47 in 1000s, a \$5 premium over the 5V version.

Vadem Second-Sources Intel PCMCIA Chip

Vadem announced its VG-365, a pin-compatible version of Intel's popular 82365SL PCMCIA card-socket controller. The VG-365 is the first "drop-in" replacement for Intel's chip, and Vadem is quoting a price of \$15 in OEM quantities, 25% less than Intel's public price.

The company also announced availability of its '465 and '468 chips (see [070103.PDF](#)). The '465 is a low-cost solution for systems with a single PCMCIA slot, and the '468 (like the '365) is a dual-slot controller. Both '46x parts integrate "hot insertion" buffers and offer additional power-management capabilities while maintaining register compatibility with Intel's chip, ensuring ExCA hardware compliance. SystemSoft (Boston, MA) will provide ExCA software for card and socket services that support the Vadem chips.

The '46x parts are similar to Cirrus' 67x0 PCMCIA controllers, but Vadem is pricing these chips aggressively as well. At \$12 for the single-slot controller and \$16 for the dual-slot chip, the prices are 40% lower than Cirrus' 1000-piece pricing. The '465 is available now, with the '468 expected in June.

S3 Patent Threatens Local-Bus Vendors

Graphics-chip supplier S3 has at least one patent pending that it says is integral to VL-Bus, PCI, or any local-bus implementation, *Microprocessor Report* has learned. The news comes on the heels of Dell Computer's moves to enforce a local-bus connector patent against OEMs building VL-Bus systems (see [0704MSB.PDF](#)).

In contrast to Dell's patent maneuver—which appears to be an attempt to stall VL-Bus' momentum—S3 says it would use its pending patents purely as a defense against competitors' intellectual property claims. S3 acknowledged its pending patents but declined to provide any details of its claim.

S3's pending patent is a vestige of its initial incarnation as a chip-set supplier. In 1990, the company in-

troduced a local-bus architecture called Advanced Chip Interconnect, or ACI (see *µPR* 5/18/90, p. 1). S3 failed to make any inroads marketing the ACI chip set and later shifted its focus to graphics accelerators.

PCI 2.0 Specification Released

The PCI Special Interest Group (SIG) has released version 2.0 of the PCI specification. The most significant new feature is support for both 3.3V and 5V motherboards and add-in cards. Two connector "keys" are defined, one for each voltage, so that cards can only be plugged into systems with the correct voltage level. A "dual-voltage" card can be built that accepts both keys, so it can plug into either a 3.3V or a 5V system.

The 3.3V version is critical for PCI to become popular for notebook computers, which are quickly moving to the lower voltage. Eventually, even desktop systems will move to 3.3V, both to save power and because next-generation processors will be 3.3V devices. The dual-voltage option allows card makers to offer a single product during the lengthy transition period.

Intel is still working on its patent license terms, which the company plans to announce at PC Expo. Responding to concerns expressed in *Microprocessor Report* (see [0704MSB.PDF](#)), Intel General Counsel Tom Dunlap stated that "Intel intends to grant licenses on any existing, pending, or future patent claims which are truly required to meet any revisions of the PCI specification which are approved by Intel. However, due to the importance of intellectual property rights, we want to specify which particular patent claims actually are needed to implement the specification on a case-by-case basis."

Another change that is likely to be made in the revised patent license is that all companies using the bus—not just Intel—will be required to license any patents they have that would prohibit use of the specification. This may be the solution to blunting S3's pending patent noted above; if S3 wants to build PCI-based graphics chips, it would have to license its own pending patent to other PCI users.

Errata—Digital SPECmarks, Ramtron Clock

Because our last issue went to press before the actual announcement, the item on DEC's new Alpha systems (see [0705MSB.PDF](#)) used preliminary SPECmark ratings. The final numbers for the 100-MHz Model 300L are 45.9 SPECint92 and 63.6 SPECfp92. The 200-MHz Model 500X is rated at 110.9 SPECint92 and 164.1 SPECfp92.

In our article on DRAMs for new memory systems (see [070405.PDF](#)), we listed Ramtron's EDRAM at 50 MHz based on conservative design rules. Ramtron, however, rates its parts at 66 MHz and has built prototype systems at that speed. In a 66-MHz memory system, the EDRAM would be faster than similar-speed CDRAM or SDRAM parts. ♦