

Most Significant Bits

HP Grabs Performance Lead with PA-7150

Regaining the performance lead it lost to Digital's Alpha last year, HP announced that it will begin shipping workstations using its 125-MHz PA-7150 chip (*see 0717MSB.PDF*) later this quarter. The new system, the Model 735/125, is rated at 136 SPECint92 and 201 SPECfp92, edging the performance of the fastest Alpha system by 5% and 1%, respectively. It carries a \$40,000 price for the base configuration, which includes 32M of memory, a 1G disk, and a 19" color monitor.

Although the PA-7150 outperforms all other single-chip processors on both integer and floating-point benchmarks, IBM's multichip Power2 delivers 260 SPECfp92. Power2, however, is available only in systems even more expensive than the HP workstation. The integer performance lead will continue to change hands this year as Digital's 275-MHz 21064A, the PowerPC 604, and HP's PA-7200 debut. Even if it doesn't stay in the lead, the 7150 is a major step forward for HP; its PA-RISC performance has lagged considerably over the past several months.

Intel Offers \$250 Upgrade Chip

Expanding its OverDrive program, Intel announced that its new 50-MHz 486SX2 (*see 0804MSB.PDF*) will be available as an upgrade chip for 486SX systems running at 16, 20, or 25 MHz. As with DX2 upgrades, the SX2 product will be sold through retail channels and directly to end users. Intel's suggested list price is \$249, implying a street price of about \$200. The company also slashed the list prices of DX2 upgrades to \$369 for a 50-MHz part and \$499 for the 66-MHz version; as volumes increase, further price cuts are likely.

The SX2 upgrade increases performance by about 60% on typical PC applications. Most 486 PCs sold in the last two years have upgrade sockets for the part. So far, the DX2 chips have not been popular upgrades—most users have decided to buy new motherboards or new systems instead—but the lower prices should increase the popularity of the OverDrive products.

As we predicted (*see 080301.PDF*), Intel has refocused the "P24T" upgrade to take advantage of its 0.6-micron Pentium core. This change will allow the new chip, formally called the Pentium OverDrive Processor (PODP), to run at 100 MHz with a 33-MHz bus, delivering a significant performance boost to 486DX2 and DX4 systems. It also cuts power consumption and, we believe, reduces manufacturing cost. One problem is the 3.3-V supply used by the 0.6-micron core; the PODP socket supplies 5 V only. This problem can be solved by integrating a voltage converter in the PGA package. Intel expects to deliver the PODP by the end of this year.

Cyrix Gets Aggressive with 486DX

Wielding newfound fab capacity, Cyrix has taken an aggressive stance with its Cx486DX line, cutting prices by about 30% across the board. For example, the DX2-50 price dropped from \$288 to \$194 in 1,000-piece lots, and the DX-33 moved from \$230 to \$168.

Cyrix had been keeping its prices close to Intel's; the company's efforts at market penetration have been hindered by a lack of fab capacity created when Cyrix severed relations with foundry Texas Instruments (*see 071702.PDF*). The new prices open a bigger gap against Intel. Because of Cyrix's slower CPU core, its DX2-50 delivers performance similar to Intel's DX-33 but sells for 35% less than the \$261 Intel chip.

We believe that Cyrix's boldness stems from a recent foundry agreement with IBM. With an increased supply of chips from its new partner, Cyrix hopes to take market share from Intel with new, aggressive pricing. The company had been doing well with its 486SLC chip, but sales of this product have slowed recently, leaving the DX line to fill the gap until Cyrix can begin shipping its Pentium-class "M1" processor early next year.

VLSI Spins 45-MHz ARM6 Core

By shrinking the ARM6 core using a 0.6-micron process, VLSI Technology has increased its clock speed to a maximum of 45 MHz at 5 V. The new VYF86C06 core can be embedded in ASIC designs. It is also available in a 3-V version that runs at 33 MHz. (Although the ARM610 cannot operate below 5 V because of its cache logic, the ARM6 core, which does not include a cache, can function at lower voltages.)

The new core is also available in a standard product, the 80C060, that operates at 40 MHz using a 5-V supply. This part consists of little more than the ARM6 core and a pad ring. The 80C060 is currently sampling with volume production expected this month. In a 100-pin TQFP, the part is priced at \$27 in quantities of 100.

In addition to its high-profile design win in Apple's Newton, the ARM6 has become increasingly popular in embedded applications. VLSI says it has shipped a total of 750,000 ARM chips; GEC Plessey and Sharp also market ARM processors. The new VLSI chips offer a significant performance improvement over earlier 25-MHz versions, and the 3-V option should be attractive for cellular phones and other portable devices.

NEC's Rabbit Eases MIPS System Design

Entering a suddenly crowded market, NEC is now sampling its Rabbit system-logic chip set for R4x00 processors. The two-chip set consists of a memory controller and a bridge to a 486-compatible processor bus, allow-

ing the chip set to take advantage of standard PC system logic. The memory chip sports a 64-bit interface to either standard or synchronous DRAM for main memory, along with an optional cache using standard SRAM. The two chips connect to the CPU using the MIPS SysAD bus.

Rabbit is expected to reach volume production in 4Q94 at a price of \$70 in 10,000-unit quantities. Similar products include Toshiba's Tigershark (see [0709MSB.PDF](#)), Acer's PICA chip set (see [070501.PDF](#)), and DeskStation's LogicCore (see [0714MSB.PDF](#)). The Acer design includes an ISA bridge and sells for \$149, while LogicCore is priced at \$99. Tigershark is the least expensive at \$49, but it puts the memory on the 486 bus rather than the faster SysAD bus, reducing performance considerably. All three competing products are in production now.

Given the scarcity of vendors selling MIPS PCs (see [0716MSB.PDF](#)), it is a wonder that so many chip vendors are vying for this business. All the chip vendors claim multiple design wins for their chip sets; if this is true, we should expect a multitude of new MIPS systems in the next several months. Rabbit appears to have a price/performance edge over its competitors, but by the time it begins shipping, Acer and DeskStation expect to have less expensive designs.

IBM Picks Up C&T's x86 Code

Sources say that IBM Microelectronics bought certain intellectual property, including CPU microcode and test vectors, from the remains of Chips and Technologies' ill-fated 386 effort. This report supports our belief that IBM will develop and market independently developed Pentium-class processors. The C&T property might also be useful in the development of the rumored 615 processor, which combines a PowerPC CPU with additional logic for x86 instruction emulation.

NEC Introduces First 16M Rambus DRAM

Taking Rambus to the next level, NEC has introduced 16M and 18M Rambus DRAMs (RDRAMs). These parts use the 500-Mbyte/s interface developed by Rambus (Mt. View, Calif.). Toshiba and Fujitsu have been delivering 4M RDRAMs (see [070304.PDF](#)), but the overhead of the Rambus interface on these smaller parts greatly increases the die size (and cost). With the larger 16M parts, NEC claims that the price premium over standard DRAMs will ultimately be 20%, although the initial parts will carry a higher price.

NEC expects to sample the new chips in 2Q94, with "limited" production in 3Q94. Sample pricing is \$150 for 16M parts and \$170 for 18M parts; the company did not announce a production price.

Because there are no standard chip sets or CPUs that connect to Rambus, NEC is offering a Rambus interface as an ASIC cell. Customers may begin designs

with the Rambus interface this quarter.

Oki and Goldstar recently announced their support for Rambus, bringing the number of potential RDRAM vendors to five, but neither has introduced any products. At this time, there have been no commercial systems using RDRAMs announced, but Rambus assures us that dozens of designs are in progress and that some will be unveiled soon. Graphics vendors are likely to be early adopters of Rambus, so they can take advantage of its 500-Mbyte/s bandwidth to refresh large displays at a lower cost than VRAM. If the technology catches on, processor vendors may eventually incorporate a Rambus interface, since it requires only nine data lines.

IR Communications Compatibility in Sight

Infrared has emerged as a key communications method for handheld computing devices, but virtually every system has chosen an incompatible protocol and modulation technique. To solve this problem, Hewlett-Packard spearheaded the establishment of the Infrared Data Association (Irda), which has been working since last summer to develop a standard. More than 50 companies have joined the association, including PDA vendors Apple, General Magic, HP, IBM, and Sharp as well as chip vendors AMD, Cirrus, Intel, Motorola, and Texas Instruments. The member companies have committed to providing dual-mode interfaces in future devices, making them compatible both with the new standard and with their older devices.

The draft standard has been completed and will be put to a vote of the membership on April 27. Assuming it is approved, copies will be available to nonmembers in May for \$500. Irda also plans to administer a conformance mark that device makers can use to show compliance with the standard.

HP's Serial Infrared (SIR) proposal was selected for the physical layer over proposals from General Magic and Sharp while the logical layer, or Infrared Link Access Protocol (ILAP), is adapted from an IBM proposal. The base rate is 9600 bps, but devices can negotiate a higher speed up to a maximum rate of 115 kbps.

To support the new protocol, all existing devices must be modified. Irda estimates the implementation cost to be \$1.50 to \$4.50, depending on the level of integration. HP holds patents on the SIR, so users of the standard will have to obtain an HP patent license.

With a standard in place, IR communications could become widespread, with many possibilities beyond PDA-to-PDA communication. HP already offers printers with IR links, and Irda expects that telephones with IR links for wireless connection to handheld computers will be introduced. IR interfaces to computer networks would allow handheld devices to easily access printers, servers, and other network resources. For more information, contact Irda at 510.943.6546; fax 510.943.5241. ♦