# Most Significant Bits

**Intel Slams Competitors with $184 Pentium**
Girding for battle against new high-end 486 chips, Intel has slashed the price of its 75-MHz Pentium by a third, placing it at $184 in 1,000-unit quantities as of July 31. This price reduces the gap between Intel's Pentium pricing and that of AMD's 120-MHz 486, which should deliver performance similar to the low-end Pentium's. The new Pentium price is still 20% higher than that of Cyrix's 100-MHz 5x86 *(see **090901.PDF**)*; Cyrix claims that its part will match the performance of a 75-MHz Pentium but has yet to publish any benchmark information to substantiate this claim.

| | | 2Q95* | 3Q95* | %CHG |
|---|---|---|---|---|
| Intel | Pentium-133 | $935 | $694 | –26% |
| | Pentium-120 | $734 | $581 | –21% |
| | Pentium-100 | $479 | $398 | –17% |
| | Pentium-90 | $377 | $291 | –23% |
| | Pentium-75 | $275 | $184 | –33% |
| Cyrix | 5x86-100 | — | $147 | — |
| AMD | 486DX4-120 | — | $165 | — |
| | 486DX4-100 | $170 | $122 | –28% |
| | 486DX2-80 | $110 | $110 | 0% |
| TI | 486DX2-80 | — | $80 | — |
| | 486DX2-66 | — | $66 | — |

*Intel 2Q prices effective 5/1; Intel 3Q prices effective 7/31.

As the table shows, the faster Pentiums received price cuts in the 20–25% range, a reduction that is becoming mundane for Intel but one that works out to a 60–70% annual price decline. Other than the 75-MHz cut, the biggest move was at the high end, where the 133-MHz Pentium fell to $694, making room for the forthcoming 150-MHz Pentium as well as for P6 processors later this year. At the other end of the scale, Intel has finally stopped cutting the prices of the 60- and 66-MHz Pentiums, which both now list for $230. These parts should disappear rapidly from the market.

The table shows that Texas Instruments is attempting to grab the low-end 486 market from AMD and others by offering its 486DX2 at $1 per MHz. AMD is willing to leave this performance point to TI. Nearly all of its 486 yield is at 100 MHz or above, and the company has not cut the price of its 80-MHz part despite a 28% cut in the 100-MHz price. This leaves the x86 market conveniently stratified, with Intel at the top, AMD and Cyrix in the middle, and TI picking up what's left.

**AMD Claims Most Top PC Vendors**
Further expanding its reach, AMD announced that IBM and Zenith Data Systems have joined the customer list for its 486 processors. This roster now includes seven of the top ten vendors of x86-based PCs, excluding only Intel stalwarts Dell, Gateway, and Packard Bell, all of which buy most of their motherboards from Intel.

IBM's decision to buy processors from AMD appears curious, as the company builds 486 chips under license from Intel as well as its own Blue Lightning CPUs and its line of Cyrix-designed processors. None of these IBM-built chips, however, matches the performance of AMD's 100-MHz 486, and AMD will deliver faster chips later this year. Watch for these fast AMD chips to appear in IBM's consumer lines in the fall.

AMD also said it shipped 2.2 million 486 processors in 2Q95 at 100 MHz or higher, up from 1.1 million in the first quarter. Total Am486 shipments for the first half were about 5 million units, which the company plans to increase to 7 million in the second half. Unlike last year, in which AMD was constrained by lack of fab capacity, the company says it is now able to meet all demand. The company will begin shipping 486 chips from Fab 25 this quarter, with a 133-MHz device promised for next quarter. AMD's share of the 486 market is rising rapidly because of Intel's gradual withdrawal from that market, but the total 486 market is shrinking.

Because prices have dropped, AMD's 486 revenue was down slightly from the same quarter a year ago, despite considerably higher unit volume. The company expects to maintain flat 486 revenue for the next two or three quarters by boosting volume enough to compensate for price decreases. By the second quarter of next year, however, the company will need to ship the K5 to avoid a steep drop in x86 processor revenue. As for the K5, AMD says it will deliver "a few thousand" 75-MHz K5s by the end of this year, with production of devices at 90–100 MHz expected in 1Q96.

**IBM to Ship Mac OS in 1996**
From amidst the shifting sands of IBM's software strategy came a quiet acknowledgment that Big Blue will provide its customers with the option of buying Mac OS with its PowerPC-based systems next year. These PCs will implement the PowerPC hardware reference platform (formerly CHRP; see MPR 12/5/94, p. 9), allowing them to run any of a number of operating systems, including Mac OS. IBM had previously resisted bundling Apple's operating system with its future PCs.

With this announcement, IBM essentially becomes a vendor of Macintosh-compatible systems, and it is the largest PC vendor to announce an intent to license Mac OS. Presumably, the company will include the required Apple ROM in its HRP systems, at least the ones loaded with Mac OS. This move will let Mac users buy systems from either Apple, IBM, or a number of smaller Mac-compatible vendors.

 

IBM, however, will simply offer Mac OS as part of a menu that includes Windows NT, Solaris, and OS/2. The company appears ready to continue promoting OS/2 as the client OS of choice for PowerPC, despite the huge installed base of PowerPC systems running Mac OS and the large applications base for those systems. By offering all popular PowerPC operating systems, IBM can let its customers make the choice. If these customers steer away from OS/2, perhaps it will finally convince IBM to refocus its ill-fated OS.

**BAPCo Ships First NT Benchmark Suite**

The Business Applications Performance Co. (BAPCo) has shipped its first benchmark suite for Windows NT, filling a long-pending need *(see **0705ED.PDF**)* for an objective tool to compare Windows-based RISC and x86 platforms. SYSmark for Windows NT follows the application-based approach of the established SYSmark for Windows but uses 32-bit programs that are available for both Alpha and MIPS as well as the x86 architecture. PowerPC support is planned for late this year.

BAPCo had a limited range of choices for applications because of the need to find ones that were available on all three architectures. It uses Microsoft Word 6.0, Microsoft Excel 5.0, Welcom Software Technology's Texim Project 2.0e (a project-management program), and Orcad's MaxEDA 6.0 (a PCB design tool). Also in the suite, as a test of emulation speed, is the 16-bit, x86-only Microsoft PowerPoint 4.0. The benchmark suite, which is shipped on a CD-ROM, includes "crippled" versions of these programs, enabling them to be used only for running the benchmark.

The short list of 32-bit applications in the suite—only four programs, two of which are from Microsoft—is indicative of the limited software support available for Windows NT, especially for the RISC platforms. Future versions will add more applications.

The programs are controlled by a new BAPCo-developed program, called the Workload Manager, that runs the application, feeds it commands to exercise it, and records execution times. The Workload Manager reports a separate rating for each program and a composite rating for all of them.

The Workload Manager is configurable to support user-defined tests and can easily be adapted to run other applications. It can also run the NT Performance Monitor (a standard utility provided with the OS) in the background, which gives system tuners valuable information about where the performance bottlenecks lie. The program will be useful as a system optimization tool as well as for creating official benchmark results. A similar Workload Manager will be used for SYSmark for Windows 95, which is planned for release this fall.

Unlike SYSmark for Windows, which is available for a nominal $10 handling fee, SYSmark for Windows NT costs $495—a reasonable fee, considering that there are no comparable alternatives in the marketplace and given the value of the program for system tuning as well as performance reporting. It requires Windows NT 3.51. Contact BAPCo at 800.321.0457 or 408.988.7654; fax 408.765.4920.

**Intel's NSP Plans Snagged**

Originally promised to ship in June, Intel's NSP Open Design Guide has yet to appear. The CD-ROM, which includes a complete reference design and numerous documents describing the features that make up the platform, has been distributed since February under nondisclosure agreements (NDA) and has been through at least two revisions. Its failure to become a public document is due to ongoing efforts to reconcile conflicts between Intel and Microsoft *(see **0906ED.PDF**)*. Since delivery of the revised CD-ROM is dependent on the outcome of still-pending negotiations between the two companies, the eventual ship date remains uncertain.

Just when OEMs might begin shipping systems incorporating NSP also remains in question. With the industry's focus on Windows 95—which has some technical conflicts with aspects of Intel's NSP platform, according to Microsoft—it is hard to see how NSP will play much of a role this year. Intel continues to work with graphics and audio hardware vendors under NDA, attempting to ensure that appropriate peripherals and drivers will be available for system makers when the revised NSP platform finally rolls out.

**Rambus Gains Design Wins**

Bolstering the fortunes of Rambus, Cirrus Logic and Silicon Graphics (SGI) have announced graphics controllers that use Rambus frame buffers. SGI's design is embedded in its new Indigo2 Impact systems, which use the 500-Mbyte/s Rambus *(see **070304.PDF**)* to offer exceptional 3D graphics performance. The workstations use 200- or 250-MHz R4400 processors and start at $35,000 for a well-equipped configuration.

Cirrus's GD5462 is the first Rambus-based graphics chip available to other system makers. With its high-bandwidth frame buffer and a fast, 175-MHz RAMDAC on chip, the chip supports screens up to $1600 \times 1200 \times 8$. Conventional designs would require a 64-bit data path to achieve such resolutions, but the Cirrus chip relies on the 8-bit Rambus, reducing cost. The high bandwidth allows up to three simultaneous video windows at a full 30 frames/s. In a 208-pin PQFP, the chip goes for $49 in 1,000-piece quantities.

These design wins, along with Nintendo's use of the technology in the Ultra64, are the first public indications that Rambus is gaining momentum as a graphics solution. This is bad news for MoSys *(see **081002.PDF**)* and other vendors with competing solutions. ♦

 