Intergraph Gains Injunction Against Intel

A Federal judge in Alabama has dealt a blow to Intel's business practices, ruling that the company may not break off relations with Intergraph by terminating its NDA (nondisclosure agreement). Although the ruling applies only to the specifics of the Intergraph case, the judge clearly agrees with us that Intel's use of NDAs as a weapon against its customers is improper (see MPR 12/29/97, p. 3).

Both parties agree that Intel terminated Intergraph's NDA last summer, after the x86 workstation vendor had threatened to sue some of Intel's other customers for patent infringement. Intel asked Intergraph to back down, and when it didn't, terminated its NDA. Without the NDA, Intergraph had no access to the advance documentation and prototypes it needed to design future systems. Placed at a severe competitive disadvantage, Intergraph filed suit against Intel last November (see MPR 12/8/97, p. 4).

The injunction orders Intel to restore relations with Intergraph, providing the same level of access that other similar customers have. The judge found "the deliberate termination of the parties' relationship by Intel, under the terms of the NDAs and RUNDAs, is unconscionable." Intel says it will comply with the terms of the injunction but may appeal it.

The injunction simply provides relief until the full case can be heard at trial. By granting the injunction, however, the judge indicated that Intergraph has a strong case. Specifically, "The Court concludes there is a substantial likelihood that Intergraph will succeed in proving that Intel has entered into one or more agreements and contracts in restraint of trade in violation" of the Sherman Antitrust Act. Furthermore, "Intel's refusal to supply advanced CPUs and essential technical information to Intergraph likely violates…the Sherman Act."

At this point, Intel would be well advised to settle the suit, as it would probably require only an unbreakable NDA and perhaps a small cash payment. If Intergraph wins its case, it could set a precedent that would curtail Intel's aggressive business practices. Even if Intel settles, however, it may be too late: the U.S. Federal Trade Commission (FTC) has yet to press its case against Intel. If this ruling doesn't embolden the FTC, we don't know what else possibly could. —*L.G.*

National to Ship Single-Chip PC in 1999

Taking a bold step toward reducing the cost of PCs, National Semiconductor announced it will ship a "PC on a chip" by the middle of next year. The chip aims to cut the cost of low-end PCs, bringing them down even further than they are today. The integrated device will also go into non-PC devices such as information appliances.

Over the past year, National has assembled the expertise needed to build a single-chip PC through a series of acquisitions. The most prominent was CPU vendor Cyrix (see MPR 8/25/97, p. 1); others acquirees include PicoPower (system logic), Mediamatics (video compression), FIS (graphics), and Gulbransen (audio compression). National already had extensive experience in analog integration, communications, and Super I/O devices.

National did not provide a complete description of the proposed part, pending a full technical disclosure later this year. The part will be built around Cyrix's 5x86 CPU core, which is used in the MediaGX today. It will include all of the interfaces for a standard PC, such as DRAM, PCI, IDE, USB, and 1394 as well as serial and parallel ports. The chip will include 3D graphics acceleration and a RAMDAC, so it can connect directly to a monitor. All of these interfaces will require a high pin count, probably at least 400 pins.

The chip, which is being designed at National's Herzlia (Israel) facility, will also handle audio and video functions, probably including DVD playback, as well as communications (modem) functions. The 5x86 core itself is underpowered for DVD decoding, so the chip is likely to include a separate processor to handle audio and video. National calls this a "distributed processing" model.

Despite the many functions of the chip, National expects it to be relatively small, less than 100 mm^2 in its 0.25-micron CMOS process. The company's forthcoming MXi processor (see MPR 12/8/97, p. 16), which has many of the same functions and uses the larger Cayenne CPU core, measures 90 mm^2 in the same process. Thus, it seems reasonable that a 5x86-based chip with the extra system functions could fit in 100 mm^2. According to the MDR Cost Model, such a chip could cost less than $40 to manufacture.

National plans to develop multiple versions of the PC on a chip. In addition to the desktop version, a notebook version (with power management and an LCD interface) would provide space and power savings over less integrated processors. Other versions of the chip could be used in set-top boxes and other embedded applications. National also expects to create a higher-performance version using the more powerful Cayenne CPU core; this part is slated to appear in 2000 using a 0.18-micron process.

Several vendors have attempted to reduce the cost of a PC through integration, dating back to the AMD 286ZX (see MPR 10/3/90, p. 1). The only successful product in this string was Cyrix's MediaGX, which sold well last year but has since lost its key design win at Compaq.

The integration strategy has two key problems. One is that integrated processors tend to use older CPU cores; the 286ZX, for example, came out after the market had moved to the 386. By mid-1999, the PC market will have moved entirely to P6-class processors, making the 5x86 unattractive except at very low price points.

The second problem with integrated products is offering the right feature set. Since the single-chip PC, by defini-

tion, includes all PC functions, the chip must meet all important PC standards when it is released. Furthermore, it is easy for the chip to fall behind as standards change. For example, as MMX and 3D graphics became popular last year, the MediaGX lost popularity, because it doesn't include them. DRAM, I/O, and graphics requirements are changing on an annual basis and show no signs of stabilizing soon. These changes make it difficult to keep the single-chip PC current.

The chip may also be successful in the emerging information-appliance market, where low cost and low power are more important than high performance. In these devices, however, PC compatibility is often not an issue, so the National chip must compete against processors based on MIPS, ARM, and other RISC CPUs. National CEO Brian Halla is a strong believer in the integration strategy, but making it pay off in the marketplace will be a challenge. —*L.G.*

AMD Ramps 0.25-Micron K6

AMD appears to have solved its notorious production problems: the company reports its Fab 25 is now running 0.25-micron wafers in high volume, and the fab will move entirely to the new process by the end of this quarter. AMD projects it will ship 12 million K6 processors in 1998, down from earlier claims of 15 million parts but still nearly twice as many PC processors as it shipped last year (see MPR 1/26/98, p. 1).

Taking advantage of the latest production improvements, the company formally announced 0.25-micron versions of its K6 processor at speeds of 266 MHz and 300 MHz. AMD had already been shipping limited quantities of the K6-266 to IBM. With the increased 0.25-micron capacity, the company now feels confident in announcing volume availability of the part.

AMD does not use a PR rating for the K6, claiming that the part delivers clock-for-clock performance comparable to Pentium II's. The K6-233 and K6-266 fall slightly behind Pentium II, however, due to their 66-MHz bus. The K6-300 is the first chip to move to a 100-MHz version of Socket 7. The faster system bus allows the 300-MHz K6 to close the performance gap against a Pentium II-300, according to AMD's own testing.

In quantities of 1,000, the list price for the K6-300 is $246, while the K6-266 lists for $156. These prices are about 35% below Intel's list prices for the Pentium II-300 and Pentium II-266, respectively. IBM was the first company to announce a system using the K6-300; the new Aptiva E84 sells for $1,499 (sans monitor).

AMD's K6 3D (see MPR 10/27/97, p. 19) is still on track for a midyear announcement. The company still has not formally announced the mobile version of the K6-233, which AMD is currently supplying on an exclusive basis to Compaq. The mobile part uses the 0.25-micron process to reduce power. To minimize size and weight, it is packaged in a BGA rather than in the standard Socket 7 PGA. If there is additional demand for the mobile part, the company will make it generally available in the future. —*L.G.*

Cyrix Revises 6x86MX as M II-300

Trying to appeal to consumers instead of engineers, Cyrix has renamed its 6x86MX processor as the M II. The new name is a play on the chip's original code name, M2; the roman numerals are an obvious allusion to Pentium II. The company has also decided to drop the "PR" from its parts' names, although the number associated with the name will still be a performance rating, not a clock speed. Cyrix will continue to use the PR notation when it discusses the performance of its processors.

The first part to bear the new name is the M II-300. This processor performs like a Pentium II-300 on Winstone 98, according to Cyrix, but it does not operate at 300 MHz. There are actually two versions of the part: most M II-300 chips will use a 233-MHz CPU and a 66-MHz bus, but a few chips that don't quite make that speed will be released as 225/75-MHz parts. Both versions deliver roughly the same Winstone 98 performance, although performance on other benchmarks will vary slightly.

A few weeks earlier, Cyrix introduced a PR266 version of the 6x86MX, too soon to use the new name. That part runs the CPU at 208 MHz and the bus at 83 MHz. All parts at PR266 and lower will continue to be sold under the 6x86MX name; M II will be used for PR300 parts and above.

The new clock speeds were obtained by a move to IBM's CMOS-6S2 process (see MPR 9/16/96, p. 11). The PR300 version also uses a new layout that adds a sixth metal layer for better power and ground distribution. The relayout also contains circuit improvements to speed certain critical paths. As a result, the company is seeing excellent yield at 233/66 and expects to release a 250/100 version as M II-333 next month.

In 2H98, Cyrix plans to further increase speed through another process shrink, this time to CMOS-6X, a true 0.25-micron process. This process should produce an M II-350 (300/100) in Q3 and an M II-400 (350/100) in Q4. If Cyrix can deliver on this plan, it would remain two speed grades behind Intel for most of the year, possibly closing to within one speed grade by year's end.

The new PR266 and PR300 parts list for about half the price of the comparable Intel processors (see MPR 4/20/98, p. 27 for details). The Intel parts, however, deliver better performance on MMX and floating-point code. At $180, the PR300 is slightly more expensive than a Celeron-266, but plummeting prices of Socket 7 motherboards should allow PC makers to offer the two parts in similarly priced systems. The M II offers much better performance than the Celeron-266 across the board.

Capacity for the Cyrix parts should increase significantly in 2H98 as National's Maine fab begins building x86 chips. Running a 0.25-micron process similar to CMOS-6S2, the Maine fab will probably build the lower-performance MediaGX products while M II production shifts to IBM's CMOS-6X process. This plan should revitalize Cyrix's competitiveness in the basic PC segment. —*L.G.*