IBM Microelectronics Gets Java Chip License

IBM Microelectronics has become the sixth licensee of Sun's PicoJava microprocessor core. Unlike the previous five signers, IBM will offer PicoJava only as a CPU core in its ASIC library; the company has no plans to produce standard microprocessors using Java technology.

IBM follows Samsung, NEC, Mitsubishi, LG, and Rockwell (see MPR 4/2/97, p. 5) in joining Sun's Java bandwagon. Like the others, IBM acquired rights to only Sun's original PicoJava 1 core (see MPR 10/28/96, p. 28), not the revised PicoJava 2, which provides improved performance on non-Java software (see MPR 11/17/97, p. 9). IBM executives hinted, however, that the company would also license PicoJava 2 when the model becomes available, which Sun now expects to be sometime in 2Q98.

Although Sun's other licensees have the legal and technical ability to offer Java cores in merchant ASIC business, none has shown any interest in doing so, preferring instead to make specific chips targeted for end-user products. LG, for example, is pursuing the elusive "Internet appliance" market, while Samsung addresses televisions and Rockwell targets wireless communications.

At the time of the announcement, IBM had already received the necessary technology from Sun; the company is ready to accept customer design starts immediately and could be sampling parts as early as September. The PicoJava core will initially be available in IBM's 0.35-micron process; as the rest of the company's cells and tools advance to 0.25-micron rules, the Java core will be updated as well.

Sun's master plan for Java chips is running well behind schedule. After initially predicting that the first PicoJava-based chips would be available in 1Q97, the projections soon slipped into late 1997. As of 1Q98, none has appeared; Sun now expects its first PicoJava-based 701 chip sometime in 2H98. The delays could be due to technical difficulties, which are not uncommon for a new microprocessor architecture—particularly one as complex as PicoJava—or to less-than-anticipated demand for the specialized parts. Whatever the cause, it will be a few more months before vendors can realistically appraise the value of Java chips. —*J.T.*

Lucent Gets ASIC License for NEC's V850

Expanding its ASIC library, Lucent Technology's Microelectronics Group (*www.lucent.com/micro*) has licensed NEC's V850 processor core. The AT&T spinoff expects its V850 core will be ready for customer design starts in April. The deal marks the first time the V850 has been licensed outside of NEC. Both companies expect the core will be used in ASICs for disk drives and communications devices (i.e., modems).

Lucent is among the largest producers of ASICs worldwide, and the V850 is its second 32-bit microprocessor architecture, after ARM. In addition to these, Lucent offers its own DSP cores and a number of mixed-signal and communications macros developed over the years at Bell Labs. Like any good ASIC vendor, Lucent is agnostic regarding CPU architecture, offering the V850 and ARM side by side, based on customer demand. —*J.T.*

Intel i960JT Hits 100 MHz

Intel's latest installment in the 10-year-old i960 saga is the i960JT, a clock-tripled device that hits triple-digit clock speeds for the first time. The 'JT shares the same internal architecture as the other i960Jx parts (see MPR 6/20/94, p. 13) but has a 16K instruction cache and a 4K data cache. The 'JT is bus-compatible with the rest of the J-series and lists for $35 in 10,000-unit quantities.

At that price, the 'JT is a relative bargain as i960 processors go. It's only $1 more expensive than the i960JD-66, which has smaller caches and a one-third slower clock. Intel has brought the price for many of the i960 chips down from their dizzying heights recently, with the J-series parts starting at about $13 in quantity.

The i960JT also inaugurates a new package for Intel's 32-bit RISC chips, a miniature plastic BGA (ball-grid array) package that measures just 6 mm on a side, less than half the area of a PQFP-144. Over the next several weeks, Intel will begin offering all i960Jx parts in the mini-PBGA package. Intel expects the small packaging will be particularly useful in networking equipment, which is often space challenged.

Although Intel doesn't publicize the fact, the 'JT is the first i960 processor to be synthesized instead of manually designed. Although the synthesized layout creates a somewhat larger die (the 'JT measures 89 mm^2 in Intel's 0.35-micron process), it also allows the company to produce derivative parts quickly. The move suggests that application-specific chips, similar to the i960RP and 'RD but based on the J-series core, may not be far away. —*J.T.*

IBM Signs Up For ARM7 License

Against all odds, ARM found a semiconductor company that wasn't already a licensee of its ubiquitous, eponymous microprocessor core. Hot on the heels of its new PicoJava license (see earlier item), IBM Microelectronics has acquired a license for the ARM7TDMI core. As with PicoJava, IBM will use the ARM core only as part of its ASIC services; IBM has no plans to produce standard ARM-based parts.

The IBM agreement is interesting because it involves a synthesizable version of the ARM7 core (including the Thumb, debugger, hardware multiplier, and ICE interface) rather than the standard hard macro. IBM is only the second company (after LSI Logic) to publicly acknowledge receipt of a synthesizable ARM design.

IBM is already making sample chips in its 0.35-micron process for undisclosed customers; volume shipments are scheduled for midyear. In that process, the core measures just under 4 mm^2 and runs at up to 60 MHz. Because it is synthesizable, IBM will be able to migrate the core to its 0.25-micron wafers without ARM's assistance.

IBM's recent flurry of ASIC and foundry deals (see MPR 3/30/98, p. 4) should help the company fill its top-of-the-line fabs. Absent any clear product roadmap, IBM does good business selling its technology while it builds a product line. —*J.T.*

IBM 403GCX Speeds Ahead to 80 MHz

IBM has boosted the speed of its midrange embedded processor, the PowerPC 403GCX (see MPR 3/10/97 p. 5), from 66 MHz to 80 MHz. The faster part sells for $29.60, a $5 premium over the 66-MHz version. The new chip keeps the same 2:1 ratio of CPU speed to bus speed, so the external bus now runs at 40 MHz.

A second packaging option for the 403GCX will be available in July: a 160-contact "micro BGA" similar to Intel's miniature plastic BGA package (see previous item). Like Intel, IBM expects the tiny package will attract makers of networking equipment, including television set-top boxes, where IBM's embedded PowerPCs have had some success. Unlike Intel, however, IBM charges $1 more for the micro-BGA package than for the standard PQFP package.

The speed bump gives IBM's midrange line a midlife kicker, filling the void between the 66-MHz 403GCX and the 100-MHz two-way superscalar EM603e (see MPR 12/29/97, p. 10). With prices starting at just $20 in volume, there's not much room between the embedded 603e parts and the 400-series chips. Thus, further upgrades of the 403 are unlikely, as IBM (and Motorola) push the inexpensive 603e-derived parts aggressively into midrange and high-end embedded applications. The faster 403GCX should appeal mainly to current 403GC or 'GCX users looking for a socket-compatible upgrade. —*J.T.*

Hitachi Adds Flash to SH7044, SH7045

Hitachi's line of 32-bit microcontrollers got a ROM upgrade as well as a speed boost. The new SH7044 and '45 are similar to the existing SH7042 and '43 but with twice the on-chip ROM: 256K instead of 128K. More interesting is the switch from one-time-programmable to flash memory. Both parts will sell for less than $30 when production begins in 3Q98.

The initial devices will be offered at 28 MHz, the same speed as the earlier SH7042 and '43 (see MPR 8/23/93, p. 14). Two 33-MHz versions will follow, along with 3.3-V chips that run at 16 MHz. Regardless of voltage or clock speed, no extra supply voltage is required for flash programming.

The SH7044 and '45 differ only in external bus width (16 bits and 32 bits, respectively) and package type (112-lead or 144-lead PQFP). Like their predecessors, they are heavy with timing and pulse-modulation peripherals for industrial and motor-control applications. The larger flash memory allows a single chip to be used in various applications; it also supports code development before committing to a mask-programmed version. Because they are pin-compatible with the SH7042 and '43, the new chips should appeal to industrial OEMs looking for the flexibility of flash memory, or to those who just need more capacity for code storage. —*J.T.*

Sega Yanks Saturn From U.S. Shelves

Finally impacting after a long fiery descent, Saturn has disappeared from American shores as Sega discontinued U.S. distribution of its home video-game console. The move is bad news for Hitachi, which supplies three SuperH microprocessors for each Saturn, but not wholly unexpected. Saturn sales in the U.S. have been eclipsed by those of its two primary rivals for almost two years. Sales in Japan will continue.

Much of the reason for Saturn's decaying orbit is its complex internal architecture. The system is based around four different 32-bit microprocessors (two Hitachi SH7604s, an SH7034, and a Motorola 68EC000), six custom ASICs, and several separate blocks of memory (see MPR 5/30/95, p. 15). This complicated internal structure makes Saturn more expensive to build than either the PlayStation or the Nintendo 64, and Sega was forced to sell each $149 Saturn at a loss. More important, game programmers found Saturn's symmetric multiprocessing difficult to exploit effectively. With poor tool support from Sega, third parties found it more expedient to write code for only one CPU, leaving much of Saturn's potential untapped.

Amid high-level executive reorganization at Sega in Japan and the decimation of the staff at Sega of America, the company is now pinning its hopes on Katana, the next-generation home console due to appear early in 1999 (see MPR 12/29/97, p. 12). With a single SH7750 processor at its heart, Katana should be much easier to program. Katana will run Windows CE, making Sega games more easily portable between consoles and PCs. Sega's new strategy also relies more on software royalties than on hardware sales. —*J.T.*

Siemens Enters Embedded DRAM Market

Siemens has joined a small but growing contingent of companies producing embedded DRAM—that is, DRAM and logic on the same chip. The company is ready to accept design starts now, with production as early as June.

The merged logic/DRAM wafers will be fabricated in the company's Dresden (Germany) plant, in a 0.24-micron three-layer-metal process. This is currently the only Siemens fab characterized for embedded DRAM production, although the company expects three more fabs will come on line before the end of this year, vastly increasing its capacity.

Embedded DRAM is generating increasing enthusiasm among embedded designers looking for high on-chip bandwidth, short latencies, nonstandard capacities, or all of the above. Siemens' own TriCore family of embedded processors (see MPR 11/17/97, p. 13) is expected to rely on embedded DRAM when the first chips debut late this year. —*J.T.*