Most Significant Bits

Intergraph to Port Windows NT to SPARC

Intergraph will adopt the SPARC architecture for future high-end systems and port the Windows NT operating system to that architecture. The port saves face for Sun by enabling SPARC to compete in the hotly contested NT market without Sun making a corporate commitment to the major competitor of its Solaris OS. The announcement is also a long-overdue concession that Intergraph's in-house Clipper architecture is near the end of the line.

Picking SPARC was a logical move for Intergraph; the company already resells Sun workstations with its CAD software. Intergraph initially plans to add SPARC to its NT portfolio alongside x86 and Clipper, but it has cancelled development of the high-end C5 Clipper. The company says it will pursue follow-ons to its current C400 family, but it appears that SPARC will eventually displace Clipper throughout the product line.

Sun and Intergraph say that the C5 design team will be redeployed to assist with the UltraSPARC design *(see **070404.PDF**)*, which is already well underway at Sun. The party line is that the Clipper team will work to add a little-endian switch to the forthcoming processor, but this piece of work is relatively trivial. The Intergraph engineers will be more helpful with the massive layout and verification task that lies ahead before UltraSPARC reaches tape out.

The announcement is Sun's first admission that a future SPARC processor will support a little-endian mode, which is a key factor in supporting NT. A little-endian mode has recently been added to the proposed SPARC version 9 specification to assist in this effort. The current microSPARC and SuperSPARC chips are only big-endian, but Sun would not rule out the possibility that future versions of these chips could be biendian.

If Windows NT really takes off, SPARC could compete with MIPS, Alpha, and the x86 for these high-volume design wins. While Sun itself is currently promoting a Solaris-only strategy, it can now use NT as a backup plan. In any case, both the little-endian UltraSPARC chip and the NT-on-SPARC port will not be in production until 1995, giving all of the players time to see how (or if) the NT market develops.

IBM Announces Clock-Tripled 486

IBM Technology Products formally unveiled its Blue Lightning chips, which use the same processor core and 16K cache as IBM's 486SLC2 but include a 32-bit processor bus in a 386DX-compatible pin-out. The new chips have a maximum internal clock rate of 75 MHz and support doubling or tripling of the external clock to reach that frequency. Instead of the methodical "486SLC3," IBM chose to stick with the more descriptive code name.

The company did not announce the 100-MHz Blue Lightning demonstrated at Comdex last fall *(see **0616MSB.PDF**)* but plans to release that product in the near future. These high frequencies are achieved while operating at 3.3V; Intel's fastest 3.3V part runs at 40 MHz.

Blue Lightning has a die size of 82 mm^2, about the same as Intel's 0.8-micron 486DX. The IBM chip has twice as much cache memory as the DX but no floating-point unit; it also uses a more advanced 0.7-micron, four-layer-metal CMOS process (the same as IBM's PowerPC 601). IBM rates the 75-MHz Blue Lightning's performance between that of a 50-MHz and a 66-MHz 486DX2. Power consumption is much lower: 2 W compared to 5 W for the 50-MHz DX2.

As it has done with its earlier chips *(see **0705MSB.PDF**)*, IBM will market Blue Lightning to external vendors in motherboards and upgrade modules but not as stand-alone chips. The new products are now sampling and are planned for full production in September. No board-level pricing was available at press time.

The company claims to be the third largest manufacturer of x86 processors in the world, based mainly on chips supplied to the IBM PC group. Counting only those chips shipped externally, however, we estimate that the company has gained about 1% of x86 merchant market sales. IBM's inability to sell stand-alone chips, due to its licensing deal with Intel, may prevent it from ever achieving more than a single-digit market share.

Cyrix Chip Upgrades 386 System to 486

Cyrix's 486DRx^2 processor allows low-end 386 systems to be upgraded with a clock-doubled 486 CPU core. The company says that upgraded systems will see a 2× performance improvement, and most of Cyrix's benchmarks show even larger increases. The DRx^2 will be sold directly to end users as well as through resellers.

The upgrade chip uses a 386 pinout but contains the same CPU core as Cyrix's 486DLC *(see **060501PDF**)*. The CPU runs at twice the clock speed of the system and is available in speed grades of 16/32, 20/40, and 25/50 MHz. The DRx^2 cannot be used to upgrade 33-MHz or 40-MHz 386 systems, since the doubled frequency would be beyond the capabilities of the 0.8-micron CPU.

Like the DLC, the new chip contains a 1K on-chip cache. Fitting this cache into a standard 386 system is tricky, since the 386 makes no provisions for keeping the cache up-to-date when main memory is altered. One strategy would be to flush the on-chip cache after every DMA transaction, but this would badly hamper performance in some situations. Cyrix instead decided to flush only on those events that could cause a cache coherency problem.

The company did a large amount of testing to identify these system events. To ensure compatibility with a wide range of applications, Cyrix created a "breadboard" version of the DRx^2 using a DLC and external logic on a small PC board. This unit was beta-tested at more than 60 major accounts since last November; during this extensive testing, Cyrix did not find a single software application that was not compatible with the DRx^2.

Unlike the Intel 486DX, the Cyrix DRx^2 does not contain a math coprocessor. The Cyrix chip will work with any 387 coprocessor but will not match the floating-point performance of a 486DX.

Cyrix will provide the DRx^2 in an upgrade kit that includes a chip puller and cache installation software. Single-unit pricing is $300, $350, and $400 for the 32-MHz, 40-MHz, and 50-MHz processors, respectively.

There are about 10 million 386 systems in use that could be upgraded using the DRx^2. These systems are currently underpowered for most Windows applications; with the upgrade, performance should be equivalent to a low-end i486 system, enough to run Windows well. The upgrade chip is much less expensive than buying a new 486 system and is about the same price as a low-end 486 motherboard upgrade. Given the wide participation in the beta program, Cyrix appears to have found itself another modest but profitable niche in the x86 market.

Heller Leaves HaL Under Cloud

Andy Heller has resigned as CEO of HaL Computer, becoming a technology rebel without a cause. In an interview, Heller said that he has taken a position at Fujitsu, HaL's de facto parent, to help coordinate technology among all of Fujitsu's SPARC companies, including HaL, ICL, Amdahl, and the newly-acquired Ross Technology. He expects to have no direct management responsibilities, giving him time to work solely on strategic issues.

Heller confirmed that HaL's 64-bit SPARC system, originally expected to debut this year, has suffered extensive delays but he still expects that the system will outperform all others when it debuts next year. Heller's departure convinced John Cocke—who had worked with him at IBM on the POWER architecture and had accepted a position at HaL as Chief Scientist—to remain in retirement and not join the company.

Fujitsu Deploys New SPARClite

Fujitsu has extended its SPARClite family of embedded RISC processors with the high-end 86932. The new chip uses the same core CPU as the original 86930 (see µPR 11/14/90, p. 1) but increases the on-chip instruction cache from 2K to 8K while retaining the 2K data cache. It also adds a two-channel DMA controller and a 16-entry TLB. The external bus is enhanced with support for 8-bit ROM and burst-mode transactions. The '932 uses a 208-pin QFP that is pin-compatible with the '930 and is built in the same 0.8-micron, three-layer-metal CMOS process.

The TLB and larger cache should improve performance on many applications, but at a significant cost increase: the '932 is priced at $79 for the 20-MHz version and $120 for the 40-MHz version, both in quantities of 5000. Fujitsu will continue to sell the '930 as a mid-range device for $40 along with the $20 '933 at the low-end.

Alpha Targets Mobile Market

Digital will open a new design center in Palo Alto (CA) to develop Alpha microprocessors and systems for the mobile and wireless computing markets (i.e., PDAs). The Alpha architecture was originally introduced as spanning "palmtops to supercomputers," but initial processor roadmaps did not include any low-power chips. DEC did not announce a schedule for the new products, although they probably will not be available before 1995.

The new design team will be challenged to reduce the legendary power consumption of current Alpha processors enough that potential handheld devices can be used without an oven mitt. Another problem is that, unlike many of the other PDA players, Digital has not yet selected an operating system or allied with a system partner. The company plans to work with "key players in the mobile market" to solve these problems.

ETEQ Drives Down System-Logic Price

With its new ET9600 chip, ETEQ delivers a complete set of 486 system logic, breaking new ground with a price of just $10 in quantities of 1000. The 160-pin PQFP part is a cost-reduced version of the earlier ET9000 that includes a write-back cache controller, ISA bus controller, and control for up to 64M of DRAM. It requires external buffers for ISA address and data signals. The company keeps its manufacturing costs down with the low pin-count package and an inexpensive 1.0-micron CMOS process. The ET9600 is scheduled to sample in August with production in October.

Intel Says It Has Solved Flash Problems

Intel claims that it is now ramping up production of its flash memory chips, having overcome a variety of problems that had kept it from manufacturing these parts for many months *(see **0615MSB.PDF**)*. The most critical shortage has been in 8-Mbit parts, of which Intel is the sole supplier. The company had said previously that shipments on these parts would resume in 4Q93 but now expects to beat that schedule by a full quarter.

The 8M chips are now in production at Intel's own Fab 7 as well as by fab-partner NPNX (formerly NMBS) in Japan. In addition, Sharp will manufacture flash memories for Intel on its 0.6-micron, 8"-wafer production line starting in 4Q93, further boosting availability. The increased fab capacity should also eliminate supply problems for lower-density 1M and 2M parts. ♦

