Most Significant Bits

Hobbit Bows Out of PDA Market

Acknowledging the failure of its Eo Personal Communicator products, AT&T has removed its Hobbit processor from this market. The company has transferred Hobbit to its wireless-messaging group, where the CPU will be used as a microcontroller in digital cellular telephones. Although these products may eventually evolve into PDAs, AT&T has no immediate plans for this to happen. The company will continue to sell Hobbit chips, including the new 92020 family *(see **071403.PDF**)*. Plans to develop future versions of Hobbit, however, are currently being "re-evaluated."

The move also casts doubt on the future of the company's Eo subsidiary, which has suffered massive layoffs and lost CEO Alain Rossman. The company confirmed that it would "de-emphasize" the PenPoint operating system that it acquired just a few months ago *(see **0712MSB.PDF**)*. A spokesman said that Eo may continue to develop new PDA devices, but these products would not use PenPoint.

Hobbit appears to be the first casualty of the overheated PDA market, which has too many processors competing for far too few users. Eo's systems delivered more functions than Newton but, with their four-digit price tags, were simply too expensive for the consumer market. AT&T may end up as a winner despite this loss; no matter which PDA succeeds, the telecommunications giant will profit from the increase in data traffic.

AMD Revs Up with 486SX2

Attempting to differentiate itself from Intel, AMD has announced a 486SX2 processor, pushing its 486SX performance to 50 MHz. The company has recognized a gaping hole in Intel's product line: the lack of a 486SX part above 33 MHz despite DX chips that run as fast as 100 MHz. Intel uses this gap to force its performance-hungry customers to buy the higher-margin DX parts. The high margins of these DX parts, however, creates an opening for AMD.

AMD had an SX2 ready last year *(see **0711MSB.PDF**)* but chose not to market it due to a lack of fab capacity *(see **0803ED.PDF**)*. The company has become more interested in selling SX processors since developing its "clean-room" microcode *(see **0709MSB.PDF**)*, which does not include floating-point microcode. Its customers have also been asking for an SX2, leading AMD to officially announce its availability with a list price of $165 for 1,000-unit orders, compared with $137 for a 40-MHz SX and $280 for a 50-MHz DX2. The company will begin volume shipments this month.

Until now, AMD has kept its products and prices identical to Intel's, with the small exception of 40-MHz parts that carry the same price as Intel's 33-MHz versions. AMD has little incentive to do otherwise, as factory constraints make it impossible for the company to expand its market share. This time, however, AMD has moved to establish a new performance point, trying to grab some publicity and penetrate a few key accounts. The SX2 may have helped convince Compaq to accept AMD as a vendor *(see **0702MSB.PDF**)*.

AMD's differentiation may not last for long. Intel is said to be preparing an identical chip and is not likely to let AMD exploit this niche. Another strategy for Intel is to continue cutting the price of the 50-MHz DX2, which has fallen by 30% in the past three quarters. AMD will need to be more creative to come up with a product that offers longer-lasting differentiation from Intel's line.

IBM Cuts PowerPC Prices

Seeing the oncoming headlights of Intel's P54C, IBM Microelectronics cut the prices of its PowerPC 601 line by 15%. Effective immediately, the 50-MHz 601 is priced at $232, while the 66-MHz version goes for $298 and the 80-MHz chip sells for $417, all in quantities of 25,000. All these chips, including the 80-MHz version, are now shipping in volume. IBM does not publish 1,000-piece prices, but they are generally about 25% higher than these prices. Applying that increase would set the 1,000-piece prices around $290, $370, and $520, respectively.

The new prices retain PowerPC's position of offering performance similar to Pentium's at about half of the chip price. So far, no system vendor has been able to translate this advantage into a system-level advantage, but next week Apple will take its best shot. In preparation for the big event, Apple has been stockpiling PowerPC-based Macintoshes; IBM announced that it has built more than 250,000 PowerPC chips to date (including those bearing the Motorola label), most of them presumably going to Apple, since IBM has shipped only tens of thousands of PowerPC workstations.

AMD Introduces Embedded 386 Chips

AMD has handed its 386 business to its embedded division and introduced a family of embedded 386 processors, just as Intel did several months ago *(see **071405.PDF**)*. AMD has announced the 386SE and 386DE chips, which are basically identical to the existing 386SX and DX designs. The one change is that AMD has disabled the paging unit, eliminating the chips' ability to run Microsoft Windows effectively, although they still can handle DOS and Microsoft's forthcoming At Work software for embedded systems. Unlike Intel, AMD is trying to protect sales of its mainline 386 parts for PCs.

Like AMD's current 386 chips, which already are

popular in embedded applications, the SE and DE are fully static and operate from 3 to 5 V. The SE is rated at 25 MHz, while the DE hits 33 MHz. The new chips support segmentation and protected mode (but not paging) and are pin-compatible with the SX and DX. Like these parts, the SE and DE use PQFP packages; the SE is available in a new TQFP package as well. AMD also offers extended-temperature versions of the new chips.

The new chips currently use the same die as the standard 386 parts. Around the middle of the year, the company plans to move the embedded parts to a 0.7-micron, two-layer-metal process and remove the TLB, shrinking the die and reducing manufacturing cost. The 25-MHz 386SE is priced at $15 and the 33-MHz 386DE at $20, both in quantities of 10,000. By comparison, AMD charges $20 for its 40-MHz 386SXL and $29 for its 40-MHz DXL in similar quantities.

Unlike Intel, which announced its embedded 386SX and CX last fall but only recently began shipping them, AMD is immediately shipping what it has announced. The new parts stack up well against Intel's SX and CX, which cost about $27 and, like AMD's 386SE, implement a 16-bit bus. Intel was slow to address the embedded market with a 386 product, while AMD has significant sales in this area. The new AMD parts are attractively priced and should maintain that company's momentum for embedded applications.

Sharp Samples First ARM Chip

Showing the first fruit from its ARM license, Sharp Microelectronics has begun sampling the ARM610 processor, joining VLSI Technology and GEC Plessey as suppliers of the device that is at the core of Apple's Newton. Presumably, Sharp will supply its consumer electronics division, which builds the Newton MessagePad for Apple and also sells a version under its own name as the ExpertPad; until now, GEC Plessey has been the primary supplier. The chip, which Sharp calls the LH74610, is priced at $25.50 in quantities of 10,000; production volumes are promised for May.

Not content simply to build chips for the Newton, Sharp plans to promote the 20-MHz '610, which is rated at 11 Dhrystone MIPS, for embedded applications. To encourage developers to try the chip, Sharp is offering ARM's complete software development kit—including an assembler, compiler, and debugger—for $249, a 75% discount. An evaluation board is available for $1,995. Although the company is based in Japan, it has a substantial design and support organization in Camas, Washington, that will support ARM customers.

The Camas design group also will be developing standard-cell application-specific chips based on the new ARM7 core. The company's focus is on high-volume, low-cost applications, with a typical minimum quantity of 100,000 units. A large library of macrocells already has been developed for use in ASICs with Z80, V20, and V30 cores, and Sharp plans to add macrocells for PCMCIA interfaces, LCD controllers, power management, and DSP functions. Memory capabilities include flash as well as ROM and RAM.

The Camas design center can be reached by phone at 206.834.2500, or by e-mail at *arm@sharpwa.com*; call 800.642.0261 to order the development kit.

Faster i960 Is Still Affordable

By moving to a 0.8-micron process, Intel has both increased the clock speed and held down the price of its i960CF processor. The resulting jump from 33 to 40 MHz means customers can expect an overall performance increase of 21%. But the process change also results in a smaller die that should bring higher yields, so the company is charging a premium of only $20 for the faster chip: the new 40-MHz device is priced at $160 in 10,000-unit quantities. The company expects to sample the new part in May. Intel also announced that the 33-MHz chip *(see **0712MSB.PDF**)* is now available in a new PQFP package and priced at $125.

The 40-MHz 'CF is aimed at embedded applications but, at 62 Dhrystone MIPS, it competes mainly against general-purpose chips such as the MIPS R4200 and R4600 as well as Digital's 21068 (originally the 21066). The R4200, for example, is priced at $80 from NEC and should deliver about 80 MIPS. A new entrant is Winbond's W89K *(see **080303.PDF**)*, a $40 PA-RISC chip rated at 95 MIPS. Unlike these competitors, the i960 has a wealth of software, chip sets, and design tools available, along with some very big design wins, making it difficult for other processors to compete.

V810 Jumps to 50 MHz

NEC has announced in Japan that it plans to ship a new version of its V810 part that runs at 50 MHz (at 5 V), twice as fast as initial versions. According to NEC, the increase was achieved by redesigning a few critical paths in the original design; the faster version uses the same 0.8-micron CMOS process as the original 25-MHz part. The company will begin sampling the 50-MHz version to Japanese customers in June; it has no immediate plans to market the new part in other areas.

The 50-MHz V810 is rated at 36 MIPS, but this performance comes at a steep price: ¥12,000, or about $115, for samples. NEC has not yet announced a volume price for the fast part, but it would have to drop significantly to be competitive with the ARM700, which will deliver 30 MIPS for just $35 in quantities of 10,000. The ARM700 should be shipping in volume by the time that the faster V810 begins sampling.

NEC also announced plans for its next-generation V800 processor, code-named Velvet. This chip will use a half-micron CMOS process and is expected to reach 100

MHz at 3.3 V, generating 100 MIPS. Even at this high speed, the chip should dissipate only 500 mW, according to the company. NEC did not release details about the internal architecture but implied that the new CMOS process will allow for a larger on-chip cache than the 1K used in current V800 chips. The company expects to begin sampling Velvet early next year.

New AT&T DSP for Cellular Telephony

AT&T Microelectronics has announced Spectre, a chip set designed for digital cellular telephones that implement the European GSM standard. The heart of the five-chip set is the DSP1618 chip, which combines AT&T's 1600-series DSP core with an autonomous coprocessor that performs the Viterbi error-correction algorithm used by the GSM standard. The on-chip memory is divided so the coprocessor can operate in one area while the DSP processes data from the other area.

The 1618 contains 32K of ROM and 8K of RAM on the chip. The DSP core has a bit-manipulation unit that is useful for speech processing and encryption. The chip also has two serial ports, a parallel port, a timer, and general-purpose I/O, creating a highly integrated solution. It operates down to 2.7 V. At that low voltage, the chip runs at 26 MHz and consumes less than 70 mW. The fully static 1618 also supports a variety of sleep modes and, with the clock stopped, uses less than 150 µW.

The unique combination of the bit-manipulation and Viterbi units with the DSP core reduces the number of peak MIPS needed for GSM baseband operation from 35 to 19. Since the 1618 can generate 26 peak MIPS at low voltage, additional processing power is available for other tasks, allowing system designers to differentiate their products. For even more power, the chip can deliver 50 peak MIPS when running at 5 V.

The complete five-chip set contains all the analog and digital functions for the physical layer of a GSM phone, including a radio-frequency transmitter and receiver, amplifier, frequency synthesizer, and A/D and D/A converters. The chip set will sell for less than $100 in OEM quantities. The company will sell the DSP1618 by itself but has not yet set a price. AT&T expects to sample the full set in June, with volume shipments in 4Q94.

SPEC Takes Down Flags

Responding to public criticism about the increasing complexity of the compiler flags used in its published results *(see **0716ED.PDF**)*, the SPEC board of directors has approved the publication of "baseline" results for SPECint92 and SPECfp92 in future newsletters. These baseline results have strict rules governing the use of compiler flags. In general, the same compiler and the same set of compiler flags must be used for all benchmarks within a given suite. Certain unusual compiler optimizations are also excluded.

Vendors will be able to continue generating fully optimized results using whatever flags they like, but starting in June, any vendor that publishes optimized results must also publish baseline results for the same system. Optimized results will continue to use the SPECint92 and SPECfp92 designations; the baseline results will be labeled SPECint92base and SPECfp92base.

Although the naming convention is awkward, the new results will provide a better indication of the performance achievable by a typical user who does not have the knowledge needed to optimally set a variety of flags for every program. By using the same set of flags for all benchmarks, vendors will demonstrate which compiler settings provide the best performance across a range of different applications, helping users to tune their code. The spread between baseline and optimized results will indicate how susceptible a processor is to compiler tuning. *Microprocessor Report* will begin publishing the baseline results as soon as they are available.

Digital, Brooktree Enter Graphics Market

Digital and Brooktree have jointly developed a PCI-based graphics accelerator that both will market. Neither vendor has sold a PC graphics accelerator before, but both bring complementary expertise to the venture. Digital has developed a variety of workstation graphics products and has been developing a line of PCI peripherals *(see **0801MSB.PDF**)*. Brooktree is the leading supplier of RAMDAC chips for graphics subsystems.

The new device is dubbed the DECchip 21030; Brooktree will market it under a separate name that has not been determined. The 21030 is a high-performance 64-bit graphics accelerator that can handle up to 16M of DRAM or VRAM, providing 24-bit color at resolutions up to 1600 × 1280 pixels. It incorporates some workstation-type features that accelerate 3D graphics; as a result, the 21030 can draw 60,000 shaded 3D triangles per second. The companies did not reveal a WinMark figure for the new chip. Digital will sell the 21030 for $60 in quantities of 5,000 and expects volume shipments in 2Q94.

The 21030 appears competitive in performance and features with other 64-bit accelerators, such as the ATI 88800, which cost $70 in 1,000-piece lots. The ATI chip, however, includes some video acceleration features not found in the 21030. Digital sees its chip as being useful for NT systems running CAD applications, the initial focus of its Alpha NT products. The company plans to offer the chip with both Alpha and x86 software drivers, while Brooktree expects to sell mainly into the x86 market. The companies will work together to develop additional graphics chips in the future. ♦

