■ The 6502 Is Alive and Sighted in Arizona

The venerable 6502—the microprocessor that powered the Apple II computer—is now available for ASIC core designs. Western Design Center (WDC), the Mesa (Arizona) company that owns the rights to the CMOS 65C02 (see MPR 7/11/94, p. 10), has recently converted its popular microprocessor from Bill Mensch's hand taped-out mask set to a portable, foundry-independent design file. The 65C816, a 16-bit variation, and some peripheral controllers are also available.

Even as high-end embedded processors push features like superscalar technology, large caches, and triple-digit clock frequencies, WDC (*www.wdesignc.com*) has found that its customers still appreciate the firmly entrenched support for the 6502.

At just 3,349 gates, the 65C02 is not large. In a hypothetical 0.25-micron implementation, the core would measure just 0.2 mm^2 and run at 200 MHz, according to WDC. More realistically, WDC's customers might use 0.8-micron design rules, where the core might run at a more sedate 20 MHz but still occupy just 2 mm^2.

WDC licenses its designs directly to customers, who are then free to arrange with any foundry for fabrication. Lexra and ARC follow a similar business model, whereas MIPS and ARM prefer to license semiconductor vendors directly. If WDC, which has been in business for 20 years, can still enjoy brisk 6502 sales, it says a lot for the longevity of embedded systems and the halflife of a popular microprocessor.   —*J.T.*

■ V3 Adapts PCI for 32-Bit Processors

V3 Semiconductor (*www.vcubed.com*) has enlarged its line of PCI controllers with a new chip that connects to nearly any popular 32-bit embedded processor, including PowerPC, ColdFire, i960, SuperH, StrongArm, and x86 chips. To support an assortment of different processors, the chip's host-bus interface is configurable, including timing, protocol, and byte ordering, which the V360PC will reverse if necessary. The V360PC adds a PCI master/slave interface to the system, allowing designers to easily connect Ethernet, disk I/O, graphics, and other commonly available peripherals to their favorite microprocessor.

On the PCI side, the V360PC is compatible with PCI specification 2.1, including existing hot-swap requirements for CompactPCI boards. The chip also includes an I$_2$O-compatible messaging unit, which allows the processor to act as an I$_2$O controller, given the appropriate software. In 1,000-piece quantities, the 33-MHz chip sells for $29.25 in a 160-lead PQFP package.

V3 has, like Galileo Technology (*www.galileotech.com*), staked out a market niche by adding system logic to embedded microprocessors. Embedded designers have been particularly intrigued by PCI and the dream of leveraging high-volume peripherals from the PC world. Companies like Galileo, V3, and PLX have been happy to oblige. For moderate-volume applications, chips like the V360PC are an enormous boon to hardware developers looking to put together a system with as much standard logic as possible.   —*J.T.*

■ ARC Brings 15 Licensees On Board

With the signing of Toshiba, Argonaut RISC Cores (ARC) has brought the total number of licensees of its flexible 32-bit core to 15. Although only a few of these have publicly acknowledged their affiliation with ARC (*www.risccores.com*), the British company claims to be represented in disk drives, modems, and microcontrollers.

The ARC core (see MPR 7/8/96, p. 8) is unique among 32-bit licensed CPUs in part because it is synthesized but also because it allows the licensee to customize the instruction set to suit the intended need. According to ARC, only about half of its customers actually do so, but those that do often add special-purpose operations for convolutions or inserting and extracting specific bit patterns from I/O registers.

Because ARC is usually licensed directly to developers rather than to semiconductor vendors, ARC is able to target nearly any potential hardware OEM with its synthesizable core design. The customer is then free to have any foundry fabricate the chip. SPARC, MIPS, SuperH, and ARM, in contrast, are licensed to semiconductor companies only, which then pursue developers. Lexra (see MPR 2/16/98, p. 13) has recently followed in ARC's wake, marketing a synthesizable CPU core to hardware developers in an end-run around officially sanctioned MIPS licensees. The younger Lexra has had less success to date, but the growing flood of ARC users shows that the business model clearly works.   —*J.T.*

■ Samsung Does Standalone ARM7/Thumb Chip

Samsung's new KS32C6200 is a rarity among ARM processors: a general-purpose, standalone microprocessor in a standard package. The '6200 makes a good chip for ARM evaluation before committing to an ASIC, but it is overpriced as a CPU for volume production.

For $15, the 33-MHz chip includes an ARM7TDMI core, 2K of unified cache, a DRAM controller, a DMA controller, two UARTs, and some miscellaneous I/O pins. The part's 0.35-micron process tolerates voltages from 3.3 V to 5.5 V. Although $15 (in 1,000-piece quantities) is not expensive, the chip's Thumb-equipped core is no match for IBM's PowerPC 401GF (see MPR 6/17/96, p. 9), which runs at up to 75 MHz for about the same price. Motorola also has a slew of ColdFire parts that undercut Samsung's price while offering similar features. In general, the '6200 ARM chip is good for evaluation purposes and for moderate-volume production. For higher volumes, however, an ARM7TDMI-based ASIC might be in order.   —*J.T.*   Ⓜ