ARM Signs Epson, Qualcomm, and National

This month's parade of new ARM licensees includes Japanese printer maker Epson, California telephone maker Qualcomm, and Cyrix purchaser National Semiconductor. The official list of ARM adherents now stands at 30. All three companies acquired a license for the nearly ubiquitous ARM7TDMI core.

National, which was long rumored to have an ARM license, garnered a synthesizable version of the core, known as ARM7TDMI-S. It is only the third company (after LSI Logic and IBM) to acquire the synthesizable version rather than ARM's traditional process-specific hard layout. National did not reveal any plans for its core, but given that ARM development has been under way for many months, new ARM-based chips are probably not far off. Epson was also tight lipped about its ARM plans, but integrated printer controllers are an obvious choice.

For its part, Qualcomm is clear about its reason for acquiring an ARM license: the company wants to extend its line of integrated controllers for cellular telephones. Specifically planned are CDMA chips for handsets, which would compete directly with VLSI Technology's similarly ARMed CDMA devices (see MPR 6/22/98, p. 10). Qualcomm will use the ARM7 core in devices for its own handsets and will also sell some of its chips on the open market.

With ARM9 now in the hands of its semiconductor licensees (see MPR 12/8/97, p. 10) and ARM10 due to be announced at this October's Microprocessor Forum, the relative value of the ARM7 has fallen precipitously, and many new licensees have signed on. It seems as if AMD and Zilog are the only remaining holdouts in the ARM band. —*J.T.*

Motorola Cans Core+, FPGA Business

Scant months after announcing its plans for microprocessors with programmable logic (see MPR 2/16/98, p. 10), Motorola has killed the entire product family and disbanded its staff in Phoenix (Arizona) and Manchester (U.K.) as part of a corporate austerity drive.

The first Core+ part, to be named MPACF250, was to appear in 3Q98 and integrate a ColdFire microprocessor core with several thousand gates of user-programmable logic. The 'F250 was to be the first in a series of chips that borrowed Motorola's fine-grained FPGA architecture. Now, that architecture and the proposed series of Core+ parts have all been abandoned.

The combination of microprocessor and logic is an interesting one. Traditional FPGA makers like Xilinx and Altera have addressed this niche by offering synthesizable CPU core macros that can be placed and routed within their standard field-programmable parts. Motorola's approach, which combined a hard CPU core and an array of programmable logic on the same die, would have provided better CPU performance while leaving all the user logic free. Although Motorola abandoned its product line before it got started, the concept is still sound for applications with moderate volumes, as long as customers are using a compatible CPU architecture and programmable logic. After Motorola's failure, other companies may pursue this niche more vigorously. —*J.T.*

TI, Philips Cooperate on FireWire Silicon

Philips Semiconductor and Texas Instruments have called a truce in their battle over IEEE-1394 (FireWire) physical-interface layer (PHY) interface chips. The two have agreed to develop and market pin-compatible PHY chips for 400-Mbps FireWire interfaces with two to six ports. The agreement also extends to faster devices (800-, 1,600-, and 3,200-Mbps) over the next several years.

The market for FireWire silicon has grown relatively slowly, as PC makers have been hesitant to add the costly interface in advance of widespread support from Microsoft. The same problem afflicted USB, which appeared, unused, on PC motherboards throughout most of 1997, all but ignored by Windows 95.

Windows 98 includes built-in support for FireWire, but this time customers have no hardware. Without DeviceBay or strong demand for digital video recorders, FireWire will not ignite until Intel includes the interface in its chip sets. Remarkably, the company has now postponed that move until 2000, at the soonest, so it appears that FireWire will suffer from the same slow adoption rate as USB, although for the opposite reason. —*J.T.*

V3 Provides System Support for MIPS Chips

V3 Semiconductor (*www.vcubed.com*) has a new device that integrates core-logic functions for 32-bit MIPS processors such as the R4300 and R4640. Like similar chips from Galileo (see MPR 10/6/97, p. 9), V3's new V320USC includes a synchronous DRAM controller, a PCI interface, byte-ordering conversion, and I_2O-compatible messaging features. The chip also supports the current PICMG (PCI Industrial Computer Manufacturers' Group) hot-swap specification, so the chip may be used on CompactPCI boards.

At $27.50 in 10,000-piece quantities, the V320USC is priced well below Galileo's top-of-the line GT-64120, because it doesn't have a 64-bit bus to either PCI or the processor. The V3 chip is more similar to Galileo's GT-64111, a 32-bit device that sells for $24. That chip does not have the hot-swap or I_2O features of the newer V320USC, however, making the V3 part better for RAID controller and plug-in cards. The fact that at least three companies (including NEC) are building support logic for MIPS chips underlines how successful that family has become in a range of networking and other commercial embedded applications. —*J.T.*

IDT 200-MHz R5000 Goes Embedded

IDT has repositioned its high-end MIPS R5000 from workstation sales into the embedded marketplace. The 200-MHz chip, which is still used in Silicon Graphics' entry-level O2 workstation, cranks out 330 Dhrystone MIPS, according to the company. At $130 (in 10,000-piece quantities), the part sells for about half its old price as a workstation processor.

The R5000 (see MPR 1/22/96, p. 10) is bus-compatible with other midrange MIPS chips, specifically IDT's R4640, R4650, and R4700. Its large caches, L2-cache controller, and 64-bit synchronous bus interface give the chip plenty of high-end data bandwidth for networking applications.

As a workstation processor, the R5000 is showing its age. The chip's integer performance is well below that of even Pentium/MMX—much less Pentium II—and its floating-point is about the same, based on SPEC95. Pentium, too, has a 64-bit bus, but far better software support. With Pentium prices below $100, the R5000 is not a compelling value, even among MIPS processors. IDT's own R4650 sells for just $38 with many of the same features. NEC's 250-MHz VR5464 (see MPR 3/9/98, p. 1) has multiple execution units—including one for media extensions—and is a far better value, at $95, than the 200-MHz R5000.

Silicon Graphics will replace the O2 with Pentium II–based systems, so this is the end of the road for the R5000. Unless designers need bus compatibility with other MIPS-IV parts, the R5000 is too expensive for the task. —*J.T.*

MPC860 Controllers Get Smaller, Faster

Motorola has shifted production of its line of PowerPC-based MPC860 controllers (see MPR 9/11/95, p. 9) from 0.5-micron to 0.42-micron processing. As a result, the chips have gotten smaller and faster. Instead of being clocked at 25, 40, and 50 MHz, the entire chip line now runs at 33, 50, and 66 MHz. Relative pricing for the three speed grades stays the same, ranging from $33 to $62. In other words, the faster clock rate and lower power consumption are free.

All the chips are built in the same MOS-11 fab in Austin (Texas) as before, but Motorola has upgraded the line with newer equipment as demand for 0.5-micron devices dwindles. All seven chips in the family maintain their 3.3-V supply voltage and 5-V–tolerant I/O in spite of the minor process shrink. The newer devices are sampling now; production will begin in 3Q98. The shrink should be welcomed by customers, who can take advantage of the faster speed grade if they desire or simply drop the new parts in and leave their systems unchanged. —*J.T.*

ARM Spins Up Extensions for Disk Drives

ARM is developing instruction-set extensions to its popular microprocessor architecture, specifically for disk drives. Although the company would not release details, the extensions are focused on "enhanced math" and "enhanced debug" abilities. The former probably refers to improved multiply-accumulate performance and other pseudo-DSP operations common for disk-drive actuators, while the latter alludes to improved real-time visibility of the CPU core after it is embedded in an ASIC.

ARM licensees Lucent and Cirrus Logic, also part of the announcement, stated their intent to use the new extensions in upcoming disk-drive controller chips. No timeline was announced for these devices, and ARM would not disclose when the extensions themselves would be ready. Like Thumb, Piccolo, and other ARM architectural extensions, the disk-drive enhancements (which have not been named; perhaps "Head" is an option) will be separately licensed. The company indicated the extensions will initially be grafted onto the ARM9 core; sources indicate they will work with ARM7 and ARM10 designs as well.

Fanatically cost-conscious disk-drive makers are always eager to reduce the component count of their devices, and many hard disks now include both a microcontroller (for the host interface) and a DSP (for servo control). ARM is not the only company to try unifying these disk functions, but it is the most widely licensed architecture to give it a spin. To truly combine all the disk functions into one chip, a licensee would also need the mixed-signal (analog plus digital) experience necessary to integrate the read-channel electronics. About half of ARM's licensees have such mixed-signal capability, Lucent and Cirrus among them.

Although ARM's new extensions will probably not "transform the hard-disk-drive industry," as the company believes, the changes will give ARM9 licensees a toehold in the very high volume market for disk drives. —*J.T.*

Symbian Forms From Euro Tech Trio

Three European technology firms have joined forces to peddle an embedded operating system for portable wireless devices such as telephones and PDAs. The new venture, called Symbian (*www.symbian.com*), is jointly owned by British PDA maker Psion, Swedish telecommunications giant Ericsson, and its Finnish counterpart Nokia.

Symbian's major purpose is to license the EPOC operating system, which it now owns. Psion surrendered control of the OS it developed so it can focus on PDAs, and to avoid appearing to compete with EPOC's potential licensees.

Psion holds 40% ownership of Symbian, with Ericsson and Nokia splitting the remainder. Motorola, perpetually late to the digital party, has signed a memo of understanding to join the group as a fourth partner.

In the PDA space, EPOC already competes with Windows CE and 3Com's PalmOS. For cell phones, no standards have yet emerged. Symbian touts EPOC's platform independence, but the OS currently runs only on PCs (for development) and ARM chips (not incidentally, also of European origin). This should be good news for ARM licensees, which already do good business with the wireless manufacturers. If Symbian succeeds in its goal of spreading EPOC throughout the wireless world, it could be the closest thing yet to a standard operating system for cell phones and PDAs. —*J.T.*