MOST SIGNIFICANT BITS

FREESCALE EXTENDS QORIQ P1 SERIES

By Tom R. Halfhill {11/29/10-01}

Freescale's newest QorIQ communications processors expand the low-end P1 series with four chips that supersede older PowerQuicc models, upgrading the CPU from the Power e300 to the Power e500v2 core. Clock speeds of the new P1010/P1010E and P1014/P1014E will range from 533MHz to 800MHz while holding maximum power consumption to 2.75W.

Target applications include small-business routers, network-attached storage (NAS) controllers, digital-video surveillance systems, and industrial control-area networks. The P1014 chips are subsets of the P1010; the "E" models have Freescale's SEC 4.0 Lite cryptography-offload engine. All the chips have one Power e500v2 core, the same 32-bit CPU as other members of the P1 series. Missing, however, is the packet-acceleration hardware recently added to the P1017 and P1023. (See *MPR 9/6/10-01*, "Freescale Upgrades QorIQ.")

Four features distinguish the P1010 from the P1014: it has Freescale's secure-boot technology, two of Freescale's FlexCAN 3.0 controllers, a wider DDR3-800 memory interface (32 bits versus 16 bits), and an additional Gigabit Ethernet port (three versus two). Otherwise, the two are identical. Each has a USB 2.0 host/device controller with integrated PHY, two PCI Express (Gen1) interfaces, two SATA-II controllers (3.0Gbps), a memory-card controller with flash boot, four-channel DMA, four UARTs, and two I^2C interfaces.

Freescale estimates 1.1W typical power consumption at 533MHz. Maximum power is about 2.75W at 800MHz. Both processors are fabricated in 45nm silicon-on-insulator (SOI) technology and packaged in a 19mm, 425-pin thermally enhanced plastic ball-grid array (TEPBGA). First samples are expected in December, with general sampling in January and production in November 2011. Freescale hasn't announced pricing; our estimate is less than $20.

With its control-area network (CAN) interfaces, the P1010 is the obvious choice for industrial networking. Its wider DRAM interface and additional GbE port suit it for slightly higher-performance routers, and secure boot makes it the better option for tamper-resistant systems. Sacrificing those features in the P1014 shaves cost, making it more suitable for lower-end routers and NAS controllers, but there will be little difference in power consumption.

Freescale's existing P1011 and P1013 are almost identical to the P1010 and P1014 and scale to higher clock speeds, but they aren't pin compatible with the new chips, ruling out a common board design. Ditto for customers upgrading from older PowerQuicc chips—the new processors are pin compatible with each other but not with any other processors in Freescale's extensive product line. PowerQuicc users contemplating a new design can either upgrade to the new chips or to the pin-compatible P1011, P1012, P1020, P1021, P2010, or P2020, which have one or two CPU cores and scale from 400MHz to 1.2GHz.

To find new customers, Freescale needs better reference designs that are virtual product designs—including production-ready boards, operating systems, drivers, application software, and perhaps even cases. These days, only higher-end OEMs do actual design work. So far, Freescale has announced only traditional reference designs with a generic development board and board-support package. In 1Q11, Freescale plans to introduce more-specific reference designs for enterprise-level intrusion prevention and firewalls. ♦