

EMBEDDED TIDBITS

By Mark Long [8/28/00-06]

◆ ATMEL ADDS TEAK DSP TO IP LIBRARY

Atmel has licensed DSP Group's Teak DSP Core for use in the design of high-performance DSP SoCs for speech and audio processing, multimedia, wireless, high-speed modems, and telecommunications applications. Teak is a high-performance, 16-bit fixed-point DSP core (see [MPR 8/2/99-05](#), "Teak Fills Gap Between Oak and Palm") that uses a dual-MAC architecture with a peak performance of 260 mips. When implemented with Atmel's 0.18 μ m CMOS design rules, the Teak core occupies a mere 1.5mm² and consumes about 150mW. For more information: www.atmel.com.

◆ MAVERICK HELPS MAKE BEAUTIFUL MUSIC

Cirrus Logic's Maverick family of processors (EP7209/7211/7212) has been adopted for use in several Internet audio appliances.

The Diamond Rio from S3 uses a Maverick processor running embedded Linux to provide consumers with the ability to stream MP3 music to their home stereo systems. PhatNoise is also using Linux and a Maverick processor in its Phatbox MP3 player for automotive applications. The Linux code for Maverick—including the complete source for the operating system, the 2.2.1 kernel, BASH shell display, driver touch-screen keyboard, and TCP/IP networking protocol stack—is available at www.maverickaudio.com.

Compaq Computer Corporation has selected the Maverick EP7209 processor to power its new iPAQ Personal Audio Player. The iPAQ, which is equipped with a 64MB flash memory card, can hold up to two hours of digital-quality music and is compatible with multiple music formats, including MP3, WMA, and AAC.

The Maverick EP7211 has been designed for use in ultralow-power PDAs, two-way pagers, smart phones, and industrial handheld information appliances, while the EP7212 features the added capability of digital audio decompression. The EP72xx series is built around an ARM720T

processor with 8KB of four-way set-associative unified cache and a write buffer. Incorporated into the ARM720T is an enhanced MMU that supports Microsoft Windows CE and other operating systems. The EP7212 also includes a 32-bit Y2K-compliant real-time clock. For more information: www.cirrus.com.

◆ COREUM LICENSES TRIMEDIA CORE

Coreum Technology has announced that it has licensed the TM32 VLIW processor core from TriMedia Technologies. The TriMedia VLIW (very long instruction word) architecture (see [MPR 11/13/95-06](#), "First TriMedia Chip Boards PCI Bus") is applicable to media-processing tasks such as encoding/decoding MPEG video streams, encoding/decoding multichannel audio streams, or demultiplexing/multiplexing broadcast transport streams. For more information: www.trimediatechnologies.com.

◆ NEOMAGIC LICENSES MIPS 4K FAMILY

NeoMagic has licensed the MIPS32 4K processor-core family from MIPS for use in Internet appliances. The agreement includes a license, or an option to license, the entire family of MIPS32 4K 32-bit processor cores, ranging from the low-power MIPS32 4Kp, to the compact 4Km and the high-performance 4Kc (see [MPR 5/31/99-05](#), "Jade Enriches MIPS Embedded Family"). The first core to be used will be the MIPS32 4Kc 32-bit processor core. For more information: www.mips.com.

◆ BLUETOOTH IP CORE BREAKS 30K-GATE BARRIER

NewLogic has implemented a Bluetooth baseband processor in just 30K gates. The company's BOOST Core is the first of three planned Bluetooth products from NewLogic. Other products in the BOOST family include a full Bluetooth software protocol stack and a Bluetooth CMOS radio. These IP elements, when combined with a suitable microcontroller core, permit implementation of a single-chip

Bluetooth device, using industry-standard CMOS process technologies. Both the core and the protocol stack are available immediately. For more information: www.newlogic.com.

❖ MONTAVISTA AND OBJECT TECH ALLY

Hard Hat Linux vendor MontaVista Software and IBM subsidiary Object Technology International (OTI) have formed an alliance to accelerate the delivery of embedded Linux through OTI's VisualAge Micro Edition—a set of tools and runtime components for developing and deploying Java applications on connected embedded devices.

VisualAge Micro Edition includes automatic statement completion, incremental compilation, one-button build, and the ability to breakpoint source code without restarting the executing program. In a "Collaborative Package," developers also gain access to version control, support for coordinating developer workspaces, atomic bundle release, a central-repository server, and repository administration tools.

Hard Hat Linux and IBM VisualAge Micro Edition are currently available for use together on the PowerPC, with support for many other embedded microprocessors planned, including x86/Pentium and the NEC MIPS. For more information: www.mvista.com.

❖ SYMMETRIC MP SUPPORT FOR LINUX/RT

TimeSys Corp. has announced that its Linux/RT operating-system distribution now offers support for symmetric-multiprocessor system architectures. The company claims that the resource kernel within the Linux/RT OS directly incorporates real-time technology into the core OS, which supports fixed-priority scheduling (256 priorities); priority inheritance; high-resolution timers and counters; and a temporal firewall to provide guaranteed quality of service. For more information: www.timesys.com.

❖ EMBEDDED PLANET INTEGRATES LINUX, POWERPC

Embedded Planet has announced the availability of Linux Planet 1.2—a Linux-based development platform for embedded PowerPC designs. Targeted applications include networking and telecommunications, handheld computing devices, point-of-sale terminals, and factory automation. Linux Planet 1.2 features a PC-104 form-factor board with a PowerPC 823e processor; a 640 x 480-pixel liquid-crystal color display with touch-screen panel; 16M of flash memory; and 16M of SDRAM. Also included: a network-ready 10Base-T Ethernet controller, an RS-232C channel, a separate debug channel, and a PCMCIA socket.

The development platform's core modules include production-ready RPX computing engines. RPX Lite, which comes in PC104 and credit-card mechanical size, features the Motorola 823, 823e, or variants of the 850 microprocessor. RPX Lite can be manufactured in production quantities and delivered for as little as \$199, depending upon the I/O features required.

Linux Planet 1.2, with software development kit and Hard Hat Linux software, may be ordered now, with shipments expected in September 2000. Three technical support credits from MontaVista are included in the cost of the package. Pricing for Linux Planet 1.2 starts at \$4,495.

❖ QUALCOMM SAMPLING MULTIMEDIA CHIP SET

Qualcomm has announced early shipment of its MSM3300 mobile station modem (MSM) chip-set samples and system software for streaming multimedia content into mobile wireless handsets of any standard. The MSM3300 device is the centerpiece of a chip set that incorporates Qualcomm's wireless Internet launchpad suite, which includes GPS, Bluetooth connectivity, and a removable user-identity module (R-UIM) controller. Optional multimedia features, such as MP3-player software and MIDI-based multimedia software, are also integrated.

The MSM3300 chip set comprises the following: MSM3300 CDMA modem; RFT3100 analog-baseband-to-RF upconverter; IFR3300 IF-to-baseband downconverter; RFR3100 RF-to-IF downconverter; PA3100 power amplifier; and PM1000 power-management device. Qualcomm is also now shipping its QCT's IFR3300 chip, an intermediate-frequency (IF)-to-baseband receiver that features the complete integration of a GPS-band radio without additional external RF or IF chips.

Qualcomm's gpsOne position location technology merges GPS satellite and network information with SnapTrack wireless location technology to exceed the FCC's mandate requiring wireless operators to provide the location of cellular 911 calls (E-911) to emergency call centers. The MSM3300 chip set also reportedly enables personalized navigation information and area-specific weather forecasts, traffic reports, and commercial tracking services.

Production quantities of the MSM3300 and the IFR3300 solutions are expected to be available in 4Q00. For more information: www.qualcomm.com.

❖ MEDIA EXPRESS PROCESSOR DEBUTS

At the Hot Chips Symposium, empowerTel Networks unveiled its Media Express processor (MxP), an SoC that lies at the core of the company's USX1000 VoIP carrier-class switch. The USX1000 with the MxP chip has been designed to facilitate convergence between traditional telephone systems and the packetized networks used on the Internet. According to empowerTel, the MxP SoC is a high-capacity voice-processing engine that moves 672 channels of voice traffic (DS3 capacity) in both directions between a circuit-switched telephone system and an IP packet network.

The MxP is governed by a rule-based, table-driven architecture with multiple RISC processor cores and proprietary, fast content-addressable memory (CAM). This architecture provides a flexible flow engine that processes RTP (Real-time Transport Protocol) packets and bridges VoIP with

TDM (time-division multiplexed) trunks. The flow engine incorporates a proprietary binning algorithm to pack into a single packet submilliseconds of voice samples going to a common destination and having the same quality-of-service (QoS) requirements. The result is to amortize the overhead of packet headers across multiple channels, increase efficiency, and optimize usage of network bandwidth. For more information: www.empowertel.com.

◆ LEXRA RELEASES LX5280 ANALYSIS RESULTS

Lexra has released the results of a VoIP system analysis for its LX5280 RISC DSP System (see [MPR 8/23/99-05](#), “Lexra adds DSP Extensions”). According to Lexra, the results demonstrate how an RTOS can manage 8 to 12 universal-port VoIP

channels per processor along with various background RISC tasks, depending on the memory hierarchy. The analysis technique included a detailed algorithmic analysis of the G.723.1, G.729a, G.711, and G.726 line codecs; line echo cancellation; DTMF detection and generation; packet processing tasks; and RTOS tasks. Each task is characterized with instruction and data memory usage, processing time, and task priority. The entire system is analyzed for sufficient resources and each task’s meeting its deadline.

The LX5280 RISC-DSP RTL core is available under a license fee structure that starts at \$495,000, plus a unit royalty of \$1.95 per chip. The SmoothCore version of the LX5280 is also available for the TSMC 0.18-micron process. For more information: www.lexra.com. ◆

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