Marvell PXA168 Application Processor

High Performance, Highly Integrated Processor Scalable to 1.2 GHz
for Cost-Sensitive, Intelligent Consumer and Embedded Devices

▶ PRODUCT OVERVIEW

The Marvell® PXA168 processor is the flagship device in Marvell's ARMADA™ 100 series of application processors targeted at mass market opportunities in computing and consumer devices. It balances high computing and multimedia performance with low power consumption to support extended battery life, and includes a wealth of integrated peripherals to reduce overall BOM cost.

The Marvell PXA168 processor is based on a new innovative architecture that delivers the processing capabilities of an entry-level laptop to instant-on, digital consumer and embedded devices by enabling full-featured web browsing, Internet widgets, multi-format video, Adobe® Flash® based content playback, image processing, video conferencing, and sophisticated ultra-fast graphical user interfaces (GUIs). Turnkey reference designs coupled with complete software stacks speed time-to-market for devices that can include the following:

- Connected digital photo frames (DPF)
- Smartbooks and mobile computing devices
- Automotive dashboard display and consoles
- VoIP and video IP phones
- IP surveillance cameras
- e-readers and eBooks
- Home and office automation/printer user interfaces
- Personal navigation devices and fleet tracking
- Internet TV set-top boxes
- Other mass-market consumer and embedded devices

The CPU core is powered by Marvell Sheeva™ technology and is completely ARMv5 ISA and XScale compliant. Core speeds beyond 1 GHz and a direct path to commodity DDR2 SDRAM memory enable fast user responsiveness and differentiation to bring advanced applications to mainstream devices. A multimedia coprocessor powered by WMMX2 technology and a graphics engine support HD video and rich GUIs. Integrated support for standard peripherals including MLC NAND, USB2.0 HS OTG w/PHY, a 5-in-1 card reader, PCIe®, and a 10/100 Ethernet MAC can dramatically lower total BOM cost. The Marvell PXA168 also supports high-resolution displays up to WUXGA and Marvell Qdeo™ Intelligent Color Remapping technology, bringing vivid color to displays without hue shifts or clipping while preserving skin tones.

The Marvell PXA168 reference platform supports Linux, Android and Microsoft® Windows® CE 6.0r2 and r3 operating systems and a comprehensive media framework for connected consumer devices, including standard video and audio codecs, as well as Adobe Flash and Flash Lite™ players, advanced GUIs and widgets, and many third-party applications. The rich software environment speeds time-to-market and provides a common software base and a scalable platform to cover a breadth of product offerings.

The Marvell PXA168 processor is available in a 320-ball BGA package with 0.8mm ball pitch. The ARMADA 100 series also includes a 144-pin QFP package that facilitates using 2-layer PCBs. Turnkey reference designs are available to leverage the wealth of Marvell solutions, including embedded Wi-Fi, Bluetooth, power management, and video scaling solutions.
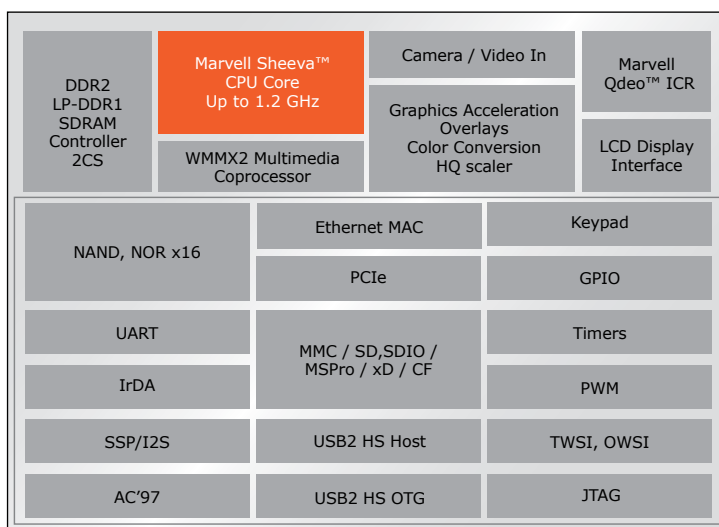
▶ BLOCK DIAGRAM

Fig 1. Marvell PXA168 Application Processor

▶ FEATURES / BENEFITS

FEATURES	BENEFITS
• Marvell Sheeva core and support for fast DDR SDRAM – L2 cache and direct path to DDR2 memory up to 533 MHz (or LP-DDR1) • WMMX2 SIMD co-processor • Extensive clock gating and low-voltage 55 nm process • "Zero-power" mode	• Faster CPU speeds and more efficient MIPS/MHz than competition bring richer features to mainstream tiers while retaining full ARM® v5TE and XScale compatibility • L1 and L2 caches and fast DDR2 speeds provide memory bandwidth for video and graphics – Targeting support for up to MPEG-4 720p video, H.264 D1 30 fps • Clock-gating and low SoC voltages support efficient MIPS/mW to reduce power consumption and extend battery life • Suspend-to-DDR mode supports extended battery life during periods of inactivity
• Highly integrated SoC – 5-in-1 card reader for SD/MMC, xD, Sony Memory Stick PRO™, and CF – Support for DDR2/LV-DDR2, and raw and managed MLC NAND; boot from NOR/NAND/MMC/SD/SPI and download from USB – SSPs, UARTs, IrDA, 10/100 Ethernet MAC, PCIe – USB 2.0 OTG, host and PHYs – AC97, PWM, one-wire and two-wire serial interfaces (OWSI, TWSI)	• Highly integrated SoC helps enable low BOM and save PCB space, helping device manufacturers to improve margins • Support for DDR2 allows OEMs to take advantage of commodity memory pricing vs. mobile SDRAM/DDR
• Integrated multimedia acceleration – WMMX2 technology – Graphics acceleration • LCD support up to WUXGA, 24 bpp • ITU-656 camera input • Qdeo Intelligent Color Remapping (ICR)	• Integrated HW components enable high-quality still-image and video on high-resolution displays • WMMX2 accelerates multimedia without external chip, while maintaining familiar programming model • Graphics accelerator enhances GUI effects for differentiation • WMMX2 accelerates multimedia without external chip, while maintaining familiar programming model • Qdeo ICR enhances color to make vivid images without hue shifts or clipping while preserving skin-tones. Part of the award-winning Qdeo suite of video processing
• Complete software offerings from drivers to GUI level • Software compatibility with ARMv5, XScale, WMMX2 • Hardware reference designs for multiple vertical segments	• Optimized BSPs, middleware for Windows Embedded and linux, as well as GUIs with Android, Adobe Flash Lite, or Silverlight for Embedded offer flexibility for system design • Software compatibility enables access to established wealth of applications and software ecosystem • Turnkey reference designs enable fast time-to-market

Note: some features available on 320 BGA package only

▶ PLATFORM SUPPORT

Hardware Platforms: Multiple turnkey reference designs

OS/GUI: Linux and Windows Embedded CE6.0r2, r3; Adobe FlashLite w/sample GUI and widgets; Android

Codecs and Middleware:

• Video: H.263, H.264 BP and partial MP, MPEG-1/2/4 ASP, M-JPEG, WMV9, Sorenson, On2

• Audio: MP3, AAC, WAV, WMA9, SBC, MIDI

• Image: PNG, GIF, BMP, TIFF, JPEG

• Middleware: OpenVG1.1, OpenGL-ES1.1

THE MARVELL ADVANTAGE: Marvell chipsets come with complete reference designs which include board layout designs, software, manufacturing diagnostic tools, documentation, and other items to assist customers with product evaluation and production. Marvell's worldwide field application engineers collaborate closely with end customers to develop and deliver new leading-edge products for quick time-to-market. Marvell utilizes world-leading semiconductor foundry and packaging services to reliably deliver high-volume and low-cost total solutions.

ABOUT MARVELL: Marvell is a leader in storage, communications, and consumer silicon solutions. Marvell's diverse product portfolio includes switching, transceiver, communications controller, processor, wireless, power management, and storage solutions that power the entire communications infrastructure, including enterprise, metro, home, storage, and digital entertainment solutions. For more information, visit our Web site at www.marvell.com.