PRODUCT OVERVIEW

The Marvell® ARMADA™ PXA2128 processor is the company’s flagship multiprocessor application processor designed for tablets and smartphones. Designed in low-power 40-nanometer (nm) process technology, it uses Marvell Hybrid-SMP technology processors at up to 1.2 GHz processing speed to provide new levels of secure Internet and multimedia performance, while achieving industry-leading battery life.

Features of the Marvell ARMADA PXA2128 include:
- Marvell optimized ARM®v7 dual High-Performance Mobile (HPM) processors with Hybrid-SMP technology at up 1.2GHz.
- Architecturally matched ARMv7 Low-Power Mobile (LPM) processor optimized with Hybrid-SMP technology for extended battery life.
- Dual-channel independent memory controllers (LPDDR2 or DDR3/DDR3L).
- Multiple power islands, dynamic voltage/frequency scaling, clock and power gating and standby modes.
- Powerful hardware accelerators for 2D/3D graphics, 1080p video, HiFi audio codecs and camera ISP.
- Dedicated security engine with hardware keys, secure memory and ARM® TrustZone® for secure boot and cryptography.

Marvell Hybrid-SMP Technology

The ARMADA PXA2128's Marvell Hybrid-SMP technology has dual HPM and LPM processors and was developed to provide easy-to-use power-efficient performance scaling. Many everyday tasks and applications can run solely on the LPM processor tuned for ultra low-power operation. Hybrid-SMP senses when more general-purpose CPU performance is required and transitions transparently and seamlessly to HPM processors in single or multi-processor SMP mode. Boost mode allows all three processors to run concurrently for short, high-performance burst processing. Hybrid-SMP LPM core transitions are completely transparent for the operating system and applications. All three processors (2xHPM + LPM) have identical instruction-set architecture features to support seamless Hybrid-SMP including ARMv7, TrustZone, L0/L1 cache size, WMMX, Neon™, VFP-D32 SIMD, CP15 support. All share a common System L2 Cache.

Coherent Memory and I/O Architecture

The ARMADA PXA2128 multi-processor Hybrid-SMP subsystem includes a coherent system L2 cache. This is coupled with a high-performance dual-channel memory controller that includes advanced transaction prioritization and combining capabilities for improved memory performance. All processors and interconnects include additional enhancements to fully utilize the 64-bit effective DDR bandwidth. This is key for 3D gaming, HTML5 content and advanced video playback across multiple high-resolution displays. Peripherals can access memory optionally as coherent with full HW support or non-coherent for high speed.

Graphics

For the next-generation of immersive user interfaces and gaming, the 2D/3D graphics engines have four shaders and two pixel pipelines that can each process two pixels per clock. This translates into peak geometry and rasterization rates of 466 Mtri/sec and 1.4 Gpix/sec, offering ample headroom for game development for console quality graphics. To further ease application development, open standards such as OpenGL®-ES2.0 and OpenVG™1.1, are supported.

Video, Audio, Display

An audio DSP hub processes and mixes multi-channel streams. Located on its own power island, it can independently access memory from the main processors, enabling extremely low-power music playback. Stereo 1080p video is supported for many popular codecs, such as H.264 HP, as well as emerging standards, such as VP8. Content can be displayed on dual MIPI DSI displays with up to 1080p resolution, or a parallel EPD panel interface, or LVDS panel up to 1600x1200 resolutions. TV-out on HDMI v1.3c 3D format is also supported. Multiple concurrent displays with overlays, rotation and scaling are supported including mirror, multi-streams and even Marvell dual-window support for Android OS.

Camera and Camcorder

HD Video Encode up to 1080p and still-image capture are pre-processed by an onboard Dxo Image Signal Processor (ISP). Beyond the standard features found in other ISPs, this provides zero shutter lag, video stabilization and temporal filtering for shooting in low-light scenarios or with high dynamic range. Advanced tools for image sensor calibration and tuning provide quality comparable to high-end Digital Signal Controllers (DSCs).

Security

A dedicated security processor in the ARMADA PXA2128 supports trusted platforms starting at the time of manufacture with securely burned fuses to trusted boot, to user/application operation. Key usage models, which include e-commerce, secure web browsing, enterprise-class VPN and DRM/content protection, are handled securely and off-loaded from the CPU, saving power.

Peripherals

The ARMADA PXA2128 supports a full complement of peripherals in discrete and PoP packages, including standard items such as MMC/SD, UART, OWSI, TWSI, USB and keypad. Other interfaces range from USB 2.0–OTG, CSI2, DSI, HSI, Slimbus® and SPMI. Also provided are Ethernet 10/100 and USB3.0 SuperSpeed device connectivity enabling 10x the speed of USB2.0.
Marvell ARMADA PXA2128 Application Processor

**APPLICATIONS**

Marvell offers platform reference designs based on the ARMADA PXA2128 processor for tablets and smartphones. The platforms incorporate the processor, the Marvell Avastar™ 88W8787 for 802.11n Wi-Fi, Bluetooth 3.0 and FM tuner support, as well as Marvell 3G basebands for high-speed cellular data and voice access. The platforms include full BSP, OS and middleware support for video, audio, 3D graphics, ISP and security.

**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.

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